Heating and Ventilating

For Engineers and Contractors Controlling the Design, Specification, Installation and Maintenance of Heating, Ventilating and Air Conditioning

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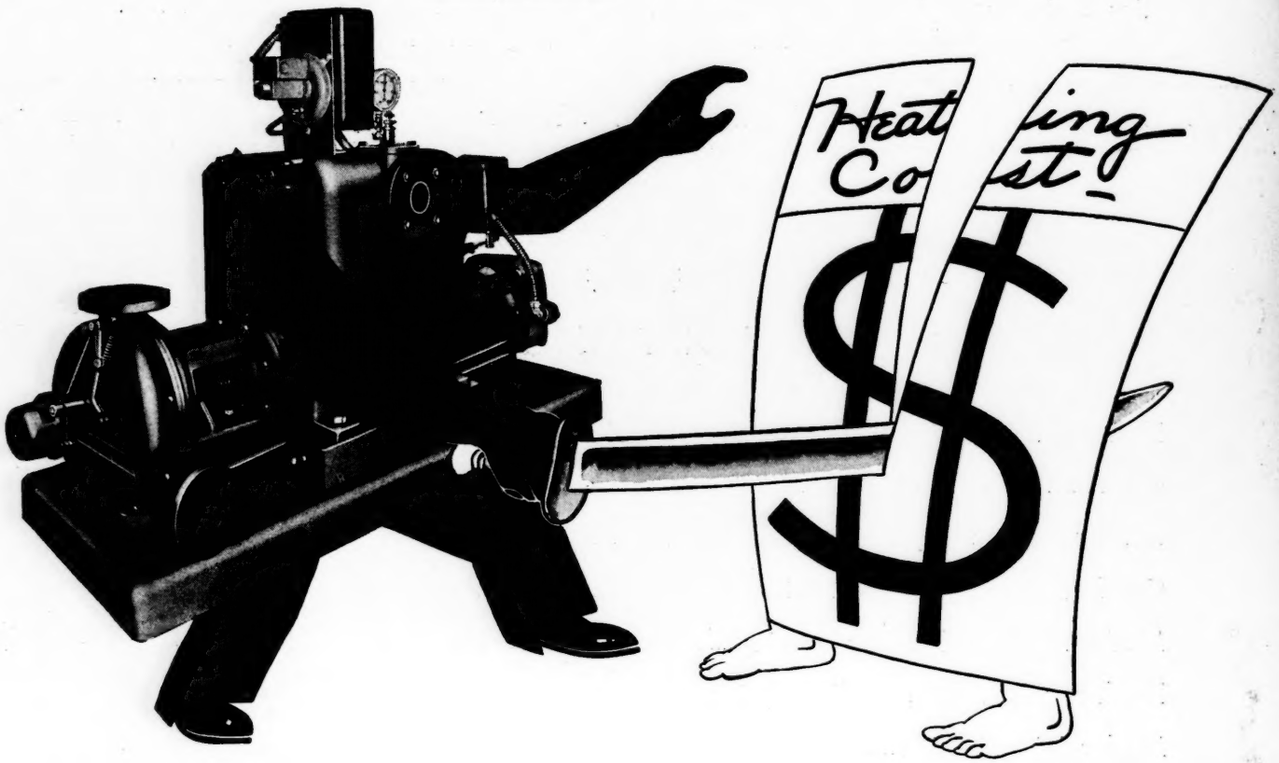
THIS NEW KIND OF HEATING PUMP CAN SLICE YOUR HEATING COSTS.



For the Vapor Turbine is far more than a return line heating pump. It is, in fact, an economical method for operating a heating system. As a pump only it shows remarkable economies over previous types, for it not only presents the most advanced ideas in engineering design, but because of an entirely new method of operation, it requires no electric current! Here, at a single stroke, is eliminated the biggest expense item in the operation of the ordinary heating pump.

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THE NASH ENGINEERING COMPANY

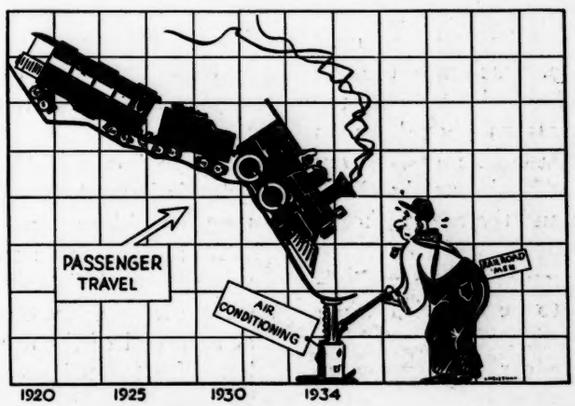
SOUTH NORWALK, CONNECTICUT, U. S. A.

NEW DEAL TRAVEL COMFORT

How the railroads are attempting to raise passenger mileage from 1890 levels by air conditioning. Over $10 million have been invested this year to provide cool, clean, quiet travel.

TEN million dollars spent last year in air conditioning railway cars. Over 425% more cars conditioned in 1934 than in all the previous years. This is the stage of development of air conditioning's latest application. The extraordinary feature of the program is that it has been carried out during a period when the railroads are less able to finance new developments than at any other time in their history. Difficult economic and engineering problems had to be overcome before air conditioning apparatus was able to secure a foothold in the railway equipment field.

The main reason for the adoption of air conditioning was to increase the number of passengers carried, not only by drawing them from competing methods of transport, but also by inducing more people to travel. Revenue passenger miles had fallen off from 33.5 billion, a five-year average for 1925-29, to 16.2 billion miles in 1933. Fewer passengers were carried in 1933 than in 1890. The cool, clean, and quiet travel that air conditioned trains provide furnishes an excellent advertising point that competing forms of transportation cannot rival.



The Washington-New York run of the Baltimore and Ohio is an excellent example to show how air conditioning increases travel. In May, 1930, when the first air cooled train was put into operation, about 100 passengers a day were carried. A competing line carried about 300 a day. By the late summer, the B. & O. was carrying 600 passengers while the other line had only 100. Thus, the total number of passengers between New York and Washington increased from 400 to 700. No decrease in passengers was noted during the cooler fall weather.

Although this was the first instance of regular schedule train air conditioning, considerable work had been done for years before. Patents were granted for cooling passenger cars as early as 1875, and in 1911 a prominent manufacturer of air conditioning apparatus built a unit for cooling cars and issued catalogs.

One of the most difficult and important factors in the

development of successful apparatus for cars was to keep the apparatus compact and light. It had to be compact because of the small amount of space available under the car and in the clerestory and also because it is never advisable to use revenue space for the equipment. The apparatus must be light because of the great distance traveled by a car in a year.

Another important point is that there should be adequate cooling, no matter what the climate. Many lines operate over territories where extreme conditions of temperature and humidity are encountered. The systems must be designed to allow for all possible conditions.

Although it is important that there be adequate cooling, it is also essential that at no time should the cars be overcooled. The railroads should profit from the mistakes made in many of the early theater installations in this respect. Overcooling will nullify all the benefits of air conditioning. It is important that there be no noticeable drafts. It requires considerable skill and ingenuity to introduce the air into the car without causing drafts and at the same time provide adequate distribution. At the present time there are two main methods of introducing the cooled air. These are known as the bulkhead method and the duct method. In the bulkhead system, the conditioning unit is placed in a compartment at either end of the train or in the center near the ceiling. The cool air is blown through a grille in the side of the compartment and travels the length of the car, settling gradually towards the floor. Return air is withdrawn through a grille in the bottom of the compartment. If properly designed, the bulkhead system gives good air distribution. Excellent results are secured when it is possible to place the conditioning unit near the center of the car as in a diner. The bulkhead method is relatively easy to install in existing equipment.

While the duct arrangement of air distribution is more expensive and more difficult to install, it is possible to get better air distribution. There are three main types of duct systems in general use. They are the single, the double, and the three-duct systems. The last has a duct on each side of the car and one in the middle. The two-duct system gives excellent results and is used in a large number of installations. Where the duct method is applied to existing equipment, the cost of the installation will be increased by approximately $600.

Reliability is a vital factor. No expert attention is available while the car is in service and if any failure occurs, usually the trouble can not be corrected until the car reaches the end of the run. Such a failure will result in complaints and ill-will on the part of the passengers. Therefore, the apparatus should be as simple and rugged as it is possible to make it. Railway service is especially severe because of the steady vibration while the train is in motion and the severe shocks due to the coupling of the cars.

The apparatus should be quiet, especially so on Pullman and other cars which are to be occupied when parked. To prevent the transmission of noises by the body and the framework of the car, the apparatus should be well isolated.

Methods of Cooling

Altogether there are five different methods of cooling cars. These are precooling, ice cooling, evaporative cooling, steam jet refrigeration, and mechanical cooling. Our records show that mechanical cooling is the most popular method in use at present.

The precooling method of conditioning was one of the first in use. It is used mainly to reduce the temperature of cars which have become hot standing in the sun. After the car is in motion, the cooling effect of the moving air is relied upon. In practically all cases, ice is used as the cooling medium. It is placed in a portable box which is provided with a fan and two flexible ducts. The ducts are inserted into the windows and the other windows of the car are closed. Then the fan is turned on, forcing the cool air into the car. This method of cooling is now usually used in conjunction with some other conditioning system while the car is in motion.

Ice Cooling

The ice cooling system is used in more instances than any other method except the mechanical. The main reasons for this are the simplicity, low initial cost, and low power load on the car. Many railroads have icing stations established for the use of their refrigerator cars so that this need is easily taken care of. It is estimated that if the cars are to be conditioned for less than 65 days per season, it is more economical to use the ice system. Many railroads have installed ice apparatus that is so arranged that it may easily and quickly be converted to a mechanical system at some later period.

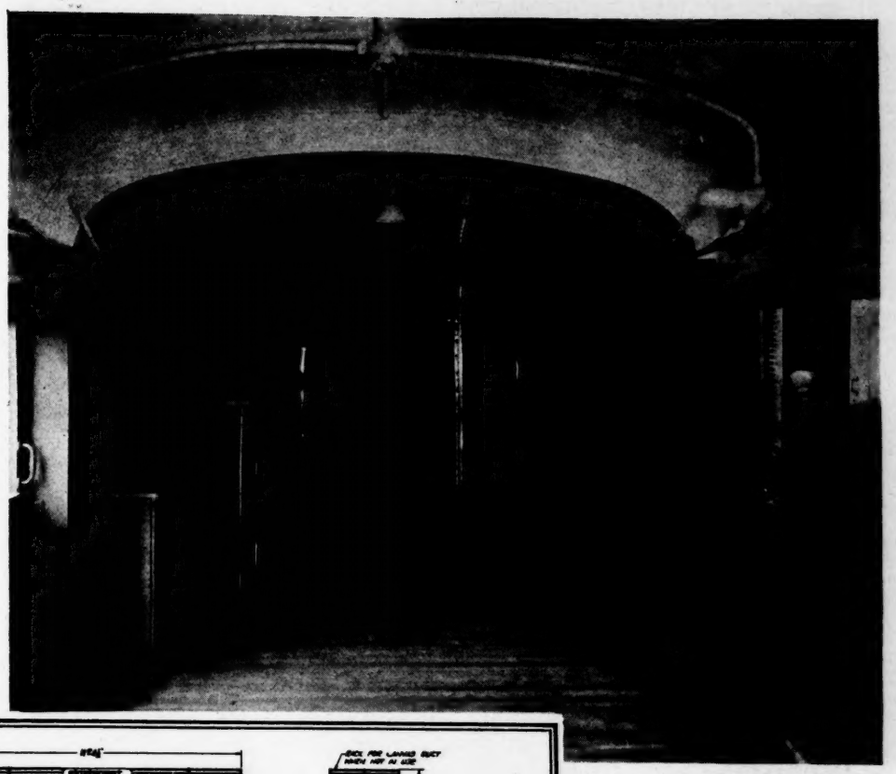
Important features of an ice system are the ice bunker, circulating water system, cooling unit, fans, and power generator.

The bunker is located beneath the car and is usually constructed so that it may be charged from either side of the car. The capacity of the bunker depends upon the service in which the car is to be used. For a New York to Chicago run approximately 6000 lb. of ice are necessary. This amount is placed in the bunker at one time as no time is allowed for re-icing while en route.

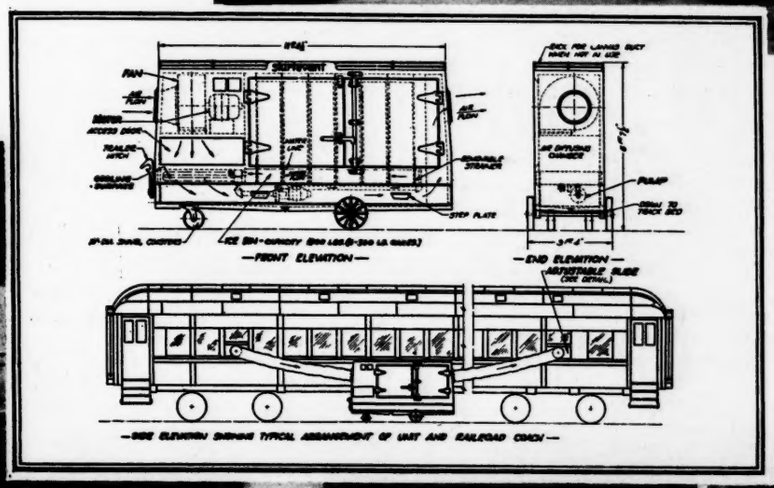
Cold water from the ice is forced by means of centrifugal pumps through the cooling coils and then back to the ice compartment where it is sprayed over the ice. A portion of the water, equal to the ice meltage, instead of returning to the ice bunker, is passed through a precooling unit in the path of the incoming warm outside air.

Approximately 50% of recirculated and 50% of outside air is used. Both streams of air are filtered and then forced by a fan over a fin type cooling coil. Either the bulkhead or duct system may be used for distributing the cool air. In many cases when the bulkhead system is used two conditioning units are provided, one at each end of the car. One large railroad has an exhaust fan located in the ceiling at the center of the car to remove the warm exhaust air.

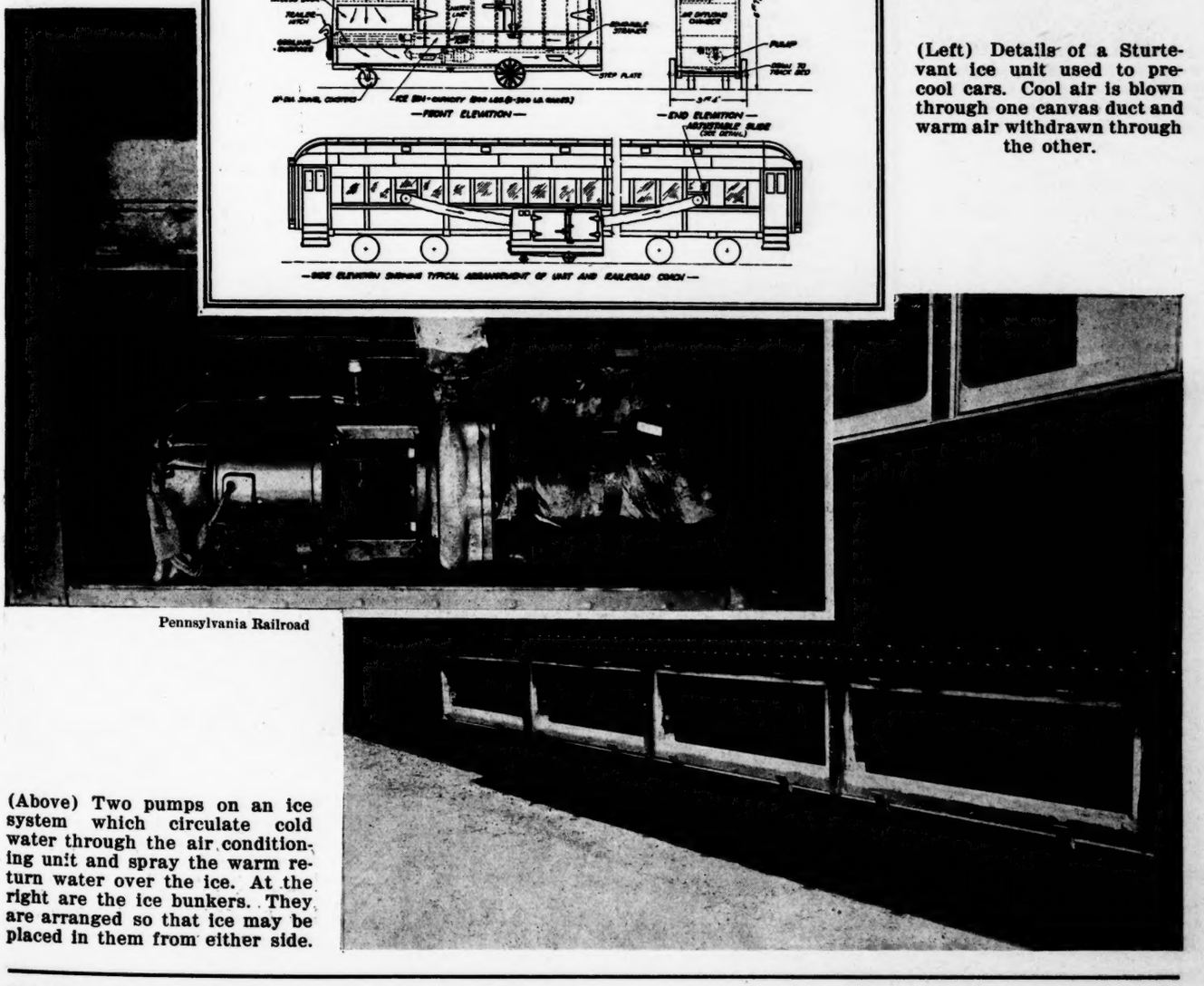
(Right) Automatic oil-fired boiler which supplies 500 lb. of steam per hour for heating the Burlington Zephyr. The boiler is located at the rear end of the baggage room. To reduce weight, the condensate from car radiators is returned to a 50 gal. feedwater tank. Storage is provided for 75 gal. of fuel oil.



E. G. Budd Manufacturing Co.

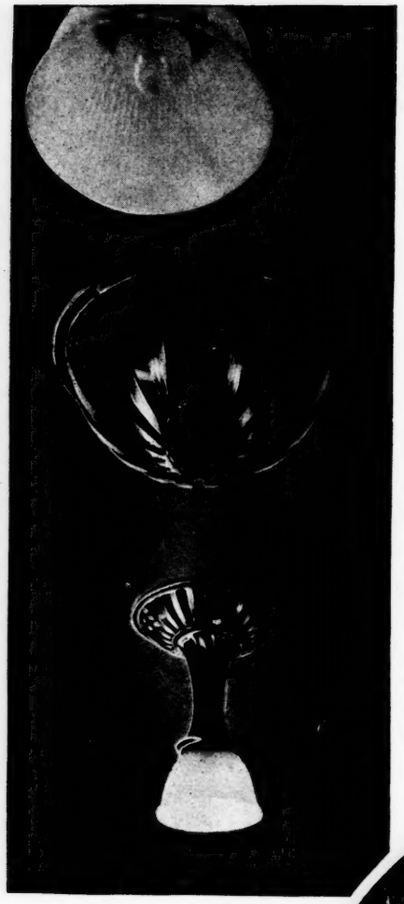


(Left) Details of a Sturtevant ice unit used to precool cars. Cool air is blown through one canvas duct and warm air withdrawn through the other.



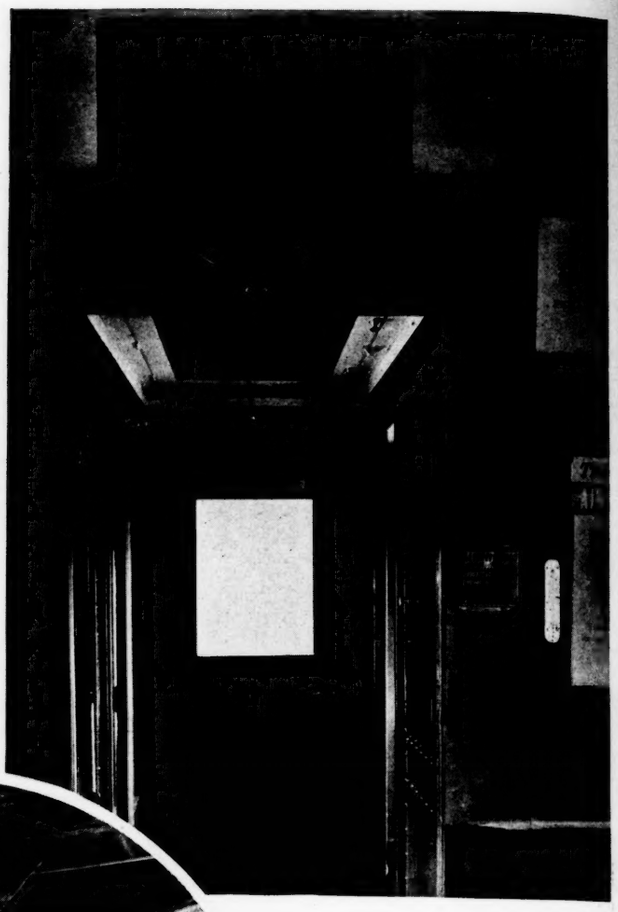
Pennsylvania Railroad

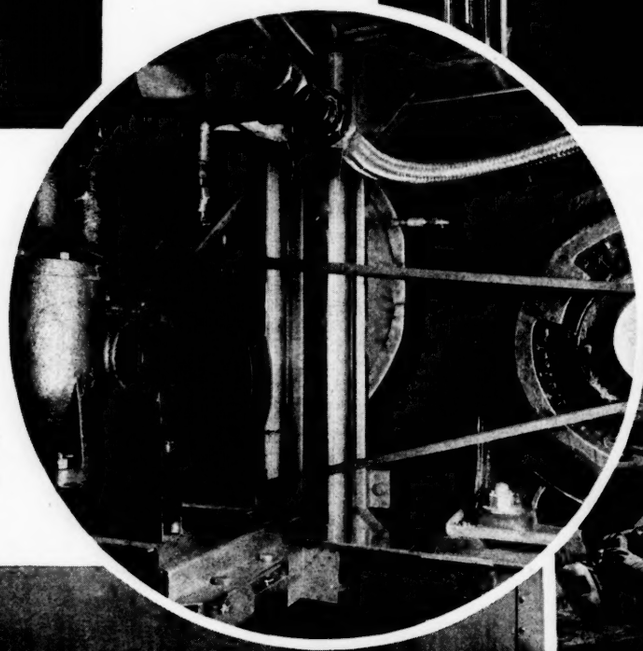
(Above) Two pumps on an ice system which circulate cold water through the air conditioning unit and spray the warm return water over the ice. At the right are the ice bunkers. They are arranged so that ice may be placed in them from either side.



(Left) An exhaust fan installed in the ceiling at the center of a Pennsylvania coach. It withdraws the warm air from the car.

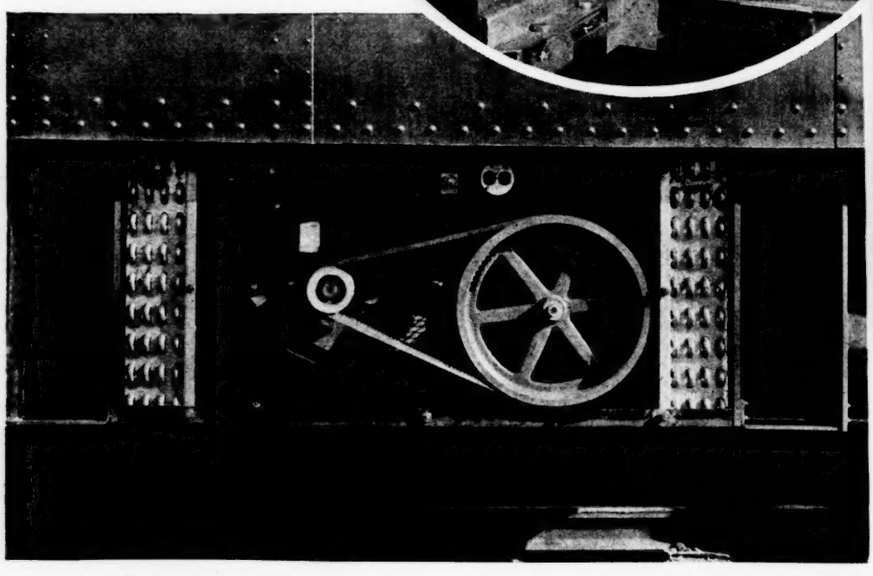
(Right) A bulkhead installation at the end of a Pennsylvania car. Air conditioning unit is located behind inlet and recirculating grilles and obtains cooling water from refrigerating machine or ice bunker located beneath the car.

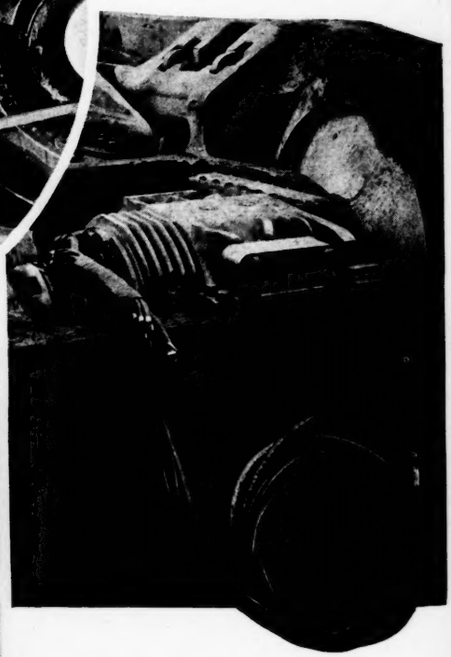




(Left) York compressor and motor used to cool a passenger compartment on the Burlington Zephyr. Unit is located beneath the car.

(Below) A Frigidaire compressor-condenser unit installed beneath a Pennsylvania car. Condenser coils are located at each end of the unit.





(Above) An axle generator as used on the Pennsylvania to supply power for the air conditioning equipment and light.

Evaporative Cooling

Evaporative cooling has been used in only one train up to the present time. This installation has been made in an experimental car in the southwest. The apparatus consists of a cotton cloth saturated with water over which air is blown. The evaporation lowers the temperature of the air which is then used to cool the car. Applications of this system are limited, as a hot dry climate is a necessity for operation.

Steam Jet

Although steam jet refrigeration got off to a slower start in railway cooling than the other methods, it now ranks third in number of installations. Many advantages are claimed for this method of cooling. It is reliable, has a low electric power consumption, and is safe. It uses about the same amount of steam as is required for heating the car in the winter. In this system the water is cooled by spraying it into a chamber where a high vacuum is maintained by a steam jet. A vacuum of 29¾ in. is used, corresponding to a temperature of about 45°. The high vacuum causes a portion of the water to evaporate, thus cooling the remainder to 45°, the boiling point at that pressure.

The steam jet or ejector which is used to obtain the vacuum consists of a number of nozzles which direct the high-speed steam through a venturi-shaped pipe and into a chamber where it is condensed. The water vapor in the expansion chamber is entrained in the high-speed steam and is carried with the steam into the condensate chamber. The condensate is removed by a vacuum pump and a portion of it is returned to the vacuum chamber to make up for the water evaporated. The cold water is taken from the vacuum or evaporating chamber and pumped through the air conditioning unit.

Mechanical Systems

There are two types of mechanical systems, the direct mechanical and the electro-mechanical. The difference lies in the method of supplying the power for the compressor. In the direct mechanical system the compressor is driven directly from the car axle. In order to drive it at approximately constant speed, a magnetic clutch is used. At low train velocities, the compressor is driven at a rate proportional to the train velocity until the rated speed is reached. Above this, the clutch slips so that the compressor speed remains constant. Advantages of this method of drive are that it permits the use of the regular car battery and generator. The disadvantages are that there is no cooling at low speeds and when the car is at rest unless some method of storing the refrigerant is provided. The slipping clutch is also an inefficient method of driving.

The electro-mechanical system utilizes an electric generator driven from the car axle to provide the necessary power. The generator is driven by gears, belts, or by direct drive, depending upon the amount of power required. Up to 5 kw. the generator is usually driven by a flat belt although there are a number of units

AIR CONDITIONED CARS IN SERVICE

Railroad	Ice	Steam	Freon	Other	Total
Atchison, Topeka & Santa Fé		58		1[1]	59
Atlantic Coast Line		7			7
Baltimore & Ohio			118		118
Boston & Maine	11				11
Central R R. of New Jersey					7
Chesapeake and Ohio			17		17
Chicago & Alton			22		22
Chicago & Eastern Illinois	4	2			6
Chicago & North Western.	12		4	1[3]	17
Chicago, Burlington & Quincy	8		13		21
Chicago, Milwaukee & St. Paul		22			22
Chicago, Rock Island & Pacific	8	12			20
Delaware, Lackawanna & Western	9				9
Denver and Rio Grande Western	12				12
Erie		20			20
Great Northern	12				12
Gulf Coast Line		2	2		4
Illinois Central			30		30
International Great Northern			2		2
Lehigh Valley			10		10
Louisville & Nashville		8			8
Maine Central	7				7
Missouri-Kansas-Texas		6	3	3[1]	12
Missouri Pacific	11	6	11	1[3]	29
Nashville, Chattanooga & St. Louis		5			5
New York Central	15		75		90
New York, Chicago & St. Louis			3		3
New Haven	30		119		149
Norfolk & Western		4	21		25
Northern Pacific			19		19
North Shore				1[3]	1
Pennsylvania	227	1	70	1[3]	299
Reading			9		9
Seaboard Air Line			26		26
St. Louis & San Francisco	27			1[3]	28
Southern Pacific	22		19		41
Texas & Pacific		7			7
Union Pacific		3	86		89
Wabash	17				17
Western Pacific		4			4
Pullman	510	57	632	1[3]	1200
Total	942	224	1311	10	2494

[1] *Methyl Chloride*
[2] *Ammonia*
[3] *Water Evaporation*

using V belts. Units between 5 kw. and 10 kw. are either belt- or gear-driven. Units larger than this are driven by either gears or are directly mounted on the axle. Direct axle-mounted generators, in spite of the necessity of using a special axle and the lack of accessibility, are favored by many railroads because of their greater reliability.

In comparing the three main types of air conditioning systems, ice, steam jet, and mechanical, there are many items to take into consideration. Class of service the equipment is to be operated in, number of days of operation, length of run, and climate are just a few of the factors that have to be taken into account. All of these have an important bearing on the type of equipment that should be used. For instance, if the period of operation is short, less than 65 days, it is usually more economical to use the ice system. If the length of the run is long, it probably will be better to use the steam jet or mechanical system rather than the ice method because of the large amount of ice necessary. Either the ice or electro-mechanical systems would probably be selected where it is necessary to cool the car while at rest. Cars equipped with either the steam jet or direct drive mechanical system will have to be supplied with steam and electricity from an outside source under these conditions.

Initial cost is an important factor in the selection of the system to be used and is one of the principal reasons for the large use of ice systems. An ice unit will cost from $2000 to $4500 completely installed, depending upon the type of car and other details of installation. While it is by far the cheapest to install, operating costs are quite high. This often makes it more economical to spend more on the initial investment and save on operating costs. Maintenance costs on ice systems are low as there are only two moving parts.

Mechanical systems, either direct or electric drive, cost between $6000 and $9000 to install including, in the case of the electric drive, the larger generator and battery. Operating costs are much lower than with the ice system and in this respect compare favorably with those of the steam jet system. Maintenance costs are high, due mainly to the complexity and number of moving parts.

Steam jet systems cost approximately $8000 installed. Operating costs are usually equal or slightly lower than those of the mechanical systems and much lower than those of the ice method. Although the maintenance costs are slightly more than for the ice system, they are considerably less than for the mechanical system.

Another reason why the ice system is favored by a number of railroads is that it does not greatly increase the power required to move the train. The electrical load on the car is increased by only ¾ kw. so that usually no change is necessary in the size of the generator or battery. The total power load on an ice cooled car is usually taken as 4 kw., including 3 kw. for lighting purposes.

Electro-mechanical systems greatly increase the power load and in all cases larger generators and batteries are necessary. The amount of power used will depend upon the tonnage of the refrigerating machine which in turn depends upon the type of car. A coach which needs approximately 7 tons of refrigeration will have to have a 20-kw. generator installed in order to supply sufficient current for power and lights. A diner needs approximately 5 tons to cool it and in most cases a 15-kw. generator is sufficient. A Pullman requires only slightly more than 4 tons and a 15-kw. generator is used. One advantage for the electro-mechanical and the ice systems lies in the fact that no additional power has to be supplied to the car for precooling or when it is standing still.

The direct-drive mechanical system does not require a larger generator or battery as it uses approximately the same amount of power as the ice method. For precooling or cooling at terminals, an auxiliary motor with a plug-in attachment is provided so that power may be obtained from outside the car.

Only occasionally is it necessary to provide larger generators with a steam jet system. Approximately 2 kw. are required, not including current for lighting.

The locomotive is affected least when the ice system is used because of the small amount of power that is required. The steam jet system requires only slightly more power but it does require steam from the locomotive. Since the amount is about equal to that supplied in the winter for heating, the boiler usually has sufficient capacity without decreasing the supply to the cylinders. Whether the electro-mechanical or the direct mechanical system is used, the effect on the locomotive is the same. The power has to be developed at the wheels. In long trains, 15 cars, the loss in tractive power reaches considerable amounts at high speeds. It may decrease the available tractive force by 20% so that three cars would have to be taken off the train.

Both the ice and the steam jet systems are considered quite reliable because of the small number of moving parts. Control of the steam jet system is slightly more complicated than that of the ice system because of the larger power requirements. In the mechanical systems, the driving systems give the most trouble. Another source of difficulty is due to the refrigerant leaking through the seals on the compressor shaft.

Weight of apparatus is an important factor, especially so when one considers the large mileage covered by a car. It must be remembered that the apparatus has to be carried in the winter as well as in the summer. For this reason the ice system has a great advantage because of its light weight when empty. An ice unit will weigh from 3500 to 5500 lb. empty and from 5000 to 10,000 lb. full. As a trip progresses the weight decreases due to the melting ice. A mechanical system will weigh from 6000 to 8000 lb. while the steam jet system ranges from 7000 to 9000 lb.

The air conditioning unit on the Burlington Zephyr is a good example to show how light the apparatus may be made when the cars are designed for air conditioning. There are three passenger compartments on the train and each is cooled with a 1½-ton electro-mechanical unit. The small size units are made possible by the excellent manner in which the cars are insulated. The total weight of all the air conditioning apparatus, including water lines, electric cables, and refrigeration lines, does not exceed 3000 lb.

Gas Heat for Large Garage

ONE of the largest gas heating plants in the world is coupled with a most unique and effective heating and ventilating system. This combined installation was made in the large garage that houses the rolling stock and the repair department of the Pittsburgh Motor Coach Company and the Equitable Auto Company, in Pittsburgh. Not a single instance of discomfort due to carbon monoxide poisoning has occurred since the heating and ventilating system was installed.

The heating and ventilating system consists of 16 steam-serviced unit heaters, of which 11 are recirculating units and five are ventilating units, and three exhaust fans with separate systems of collecting ducts. The purpose of the recirculating units is to draw air from their individual regions in the upper parts of the building, raise its temperature by means of steam coils, and send it downward to the floor. These units serve to keep all of the air in the building in constant circulation, preventing stratification of the warmer air near the roof, and as a consequence heat loss by radiation to the outside is reduced, and greater comfort at the floor level is provided. These recirculating units are automatically operated in groups of two and three by thermostats placed in strategic locations about the building. This arrangement maintains the desired working temperature in the building with absolute uniformity.

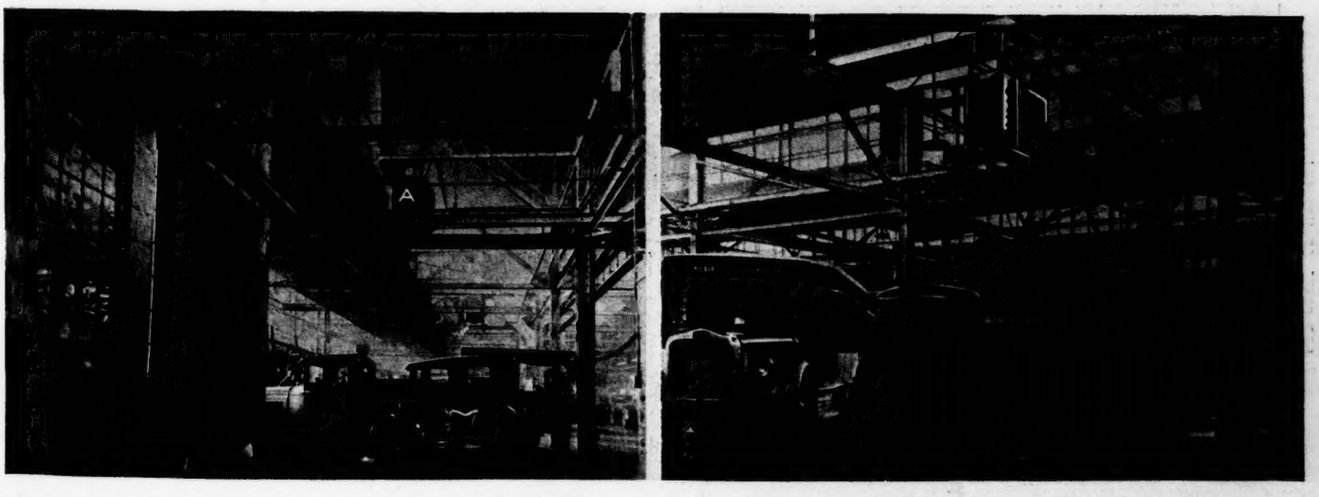
The ventilating units have their intakes connected directly to the outside along the high monitors of the building. These five units have a combined delivery of 30,000 c.f.m. of warmed fresh air.

To balance the influx of fresh air there are three exhausters with a combined capacity of 30,000 c.f.m. By means of a series of collecting ducts, having their intakes close to the floor, the coolest air is withdrawn from the buildings. The intakes have adjustable dampers. Two of the exhausters and duct systems are located along one wall of the building. Along this wall the motor coaches are lined up, and just before their peak hauling periods these coaches are all started together, exhausting large volumes of gasoline fumes into the garage. These gases are picked up immediately by the exhausting duct systems and carried to the outside before they can diffuse through the building. The third duct system is located at the opposite side of the building where repair work is constantly carried on.

In most cases the direction of the air flow from the ventilating and recirculating fans is counter to the flow to the exhaust systems. This is intended to prevent the short-circuiting of the warm air with consequent waste of heat. However, there are a few exceptions necessary for an even distribution of heat to all parts of the building. The recirculating units along the weathered wall of the building are placed so that this warm-air current sweeps the wall to dilute cold air entering by infiltration.

Each of two of the recirculating units are placed so as to direct warm-air currents against the two main motor-operated doors. These units are automatically placed in operation as the doors are raised, thus blanketing the influx of cold air. It is interesting to note here that, before the installation was made, mechanics lying under cars constantly complained of cold drafts when the doors were opened. Since these units were installed no such complaints have been made.

The steam for operating this large heating system is supplied by two of the largest gas heating boilers constructed. Each has a capacity of 100 hp. and is equipped with 36 gas burners and full automatic control and safety equipment. Each boiler has two 6-in. steam lines, two 3-in. returns, and five 14-in. flues. *Extracts from "Heating and Ventilating A Large Garage—The Modern Way," by D. W. Frye and R. M. Mullen, in "Industrial Gas," June,* 1934.



(Left) One of the ventilating heaters (A) showing intake (B) connected to outside. (Right) Recirculating unit shown in upper center foreground, ventilating unit in back.

7-Year Degree-Day Records for 49 Cities

Fluctuations of degree-days for seven heating seasons about the normal show that normal figures are safe in most cases for estimating

A year ago on these pages were presented records showing the variation of degree days for 24 cities for the previous 6-year period.*

The severity of the winter which has just passed in the East has led to numerous inquiries, regarding the comparison of the past heating season with previous years. The graphs on the accompanying pages show the variation about normal in degree days for the period beginning with the heating season 1927-28 and ending with the heating season of 1933-34, and covering 49 cities, more than twice as many as were covered in the previous article.

To the right is also shown a comparison in exact figures of the same data for the past two heating seasons for 49 cities, not all of which are the same as are shown in the graphs.

The graphs show the fluctuation of degree days in percent of normal. The 100-line appearing on each graph represents the normal number of degree days for that particular city, and the graph is plotted in percent of this normal.

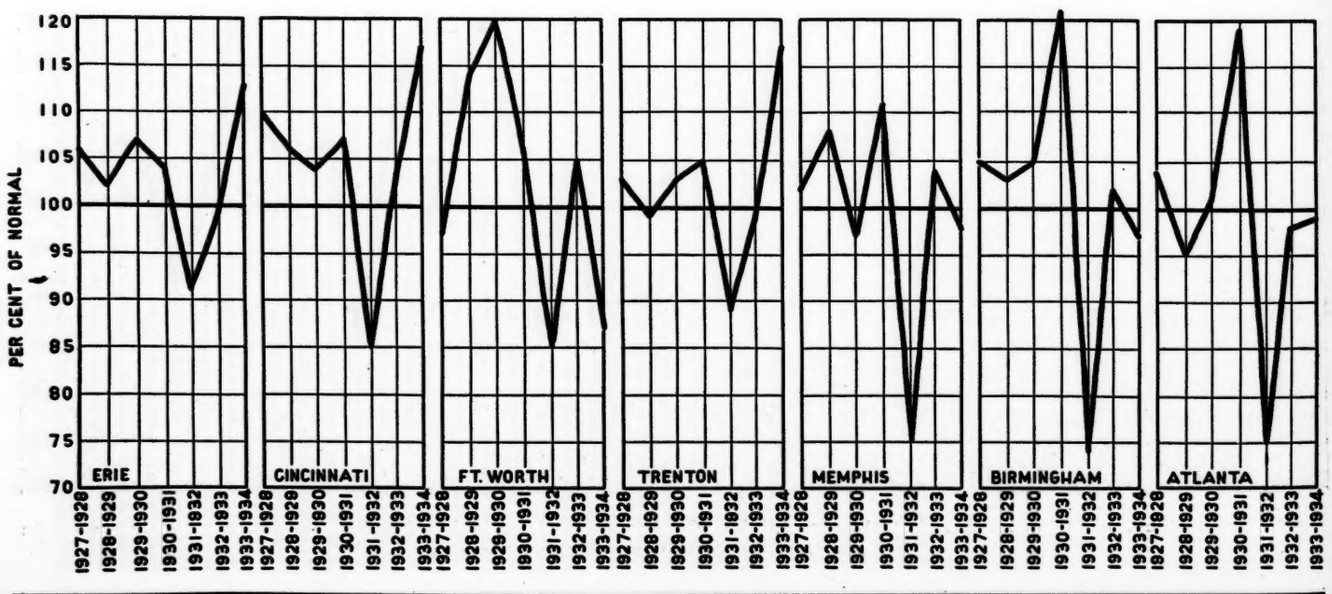
It was shown in the previous article that for the extreme southern cities the fluctuation about normal was too great for the degree day method of calculating to be of any use. Therefore some of the southern cities, such as New Orleans, have been omitted in the graphs. Some of these cities, however, are shown in the table.

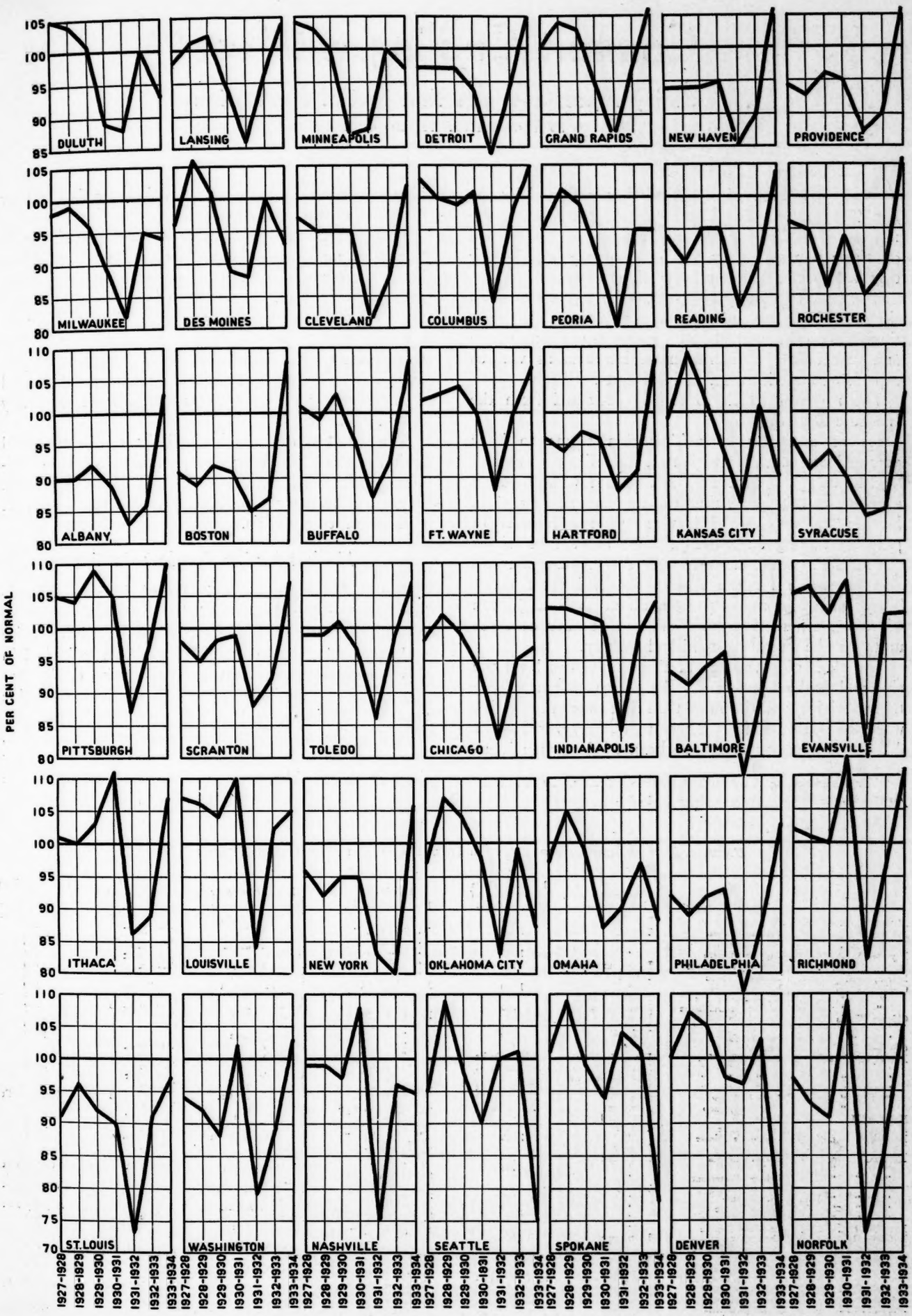
The graphs show one thing very clearly, and that is that for most cities for all practical purposes the normal figure is of sufficient accuracy on which to base fuel consumption estimates. This becomes less true as we go farther south in the country.

* "Six Years of Degree Day Records," HEATING AND VENTILATING, September, 1933, page 7.

City	Degree-Days For Season† 1932-1933	1933-1934
Albany	5902	7121
Atlanta	2821	2850
Baltimore	4072	4773
Birmingham	2470	2279
Boston	5246	6524
Buffalo	6344	7390
Chicago	6077	6102
Cincinnati	4830	5052
Cleveland	5452	6189
Davenport	6047	5907
Dayton	5116	5529
Denver	6018	4254
Des Moines	6396	5941
Detroit	6118	6822
Duluth	9643	9822
Fort Wayne	5966	6342
Grand Rapids	6346	6908
Harrisburg	5030	5757
Hartford	5502	6508
Indianapolis	5258	5489
Kansas City	4876	4369
La Crosse	7375	7123
Los Angeles	1503	862
Louisville	4284	4400
Memphis	3070	2886
Milwaukee	6838	6819
Minneapolis	7879	7604
New Haven	5345	6257
New Orleans	1093	854
New York	4808	5679
Omaha	5955	5377
Peoria	5785	5814
Philadelphia	4211	5016
Pittsburgh	5100	5723
Portland, Ore.	4574	3236
Providence	5411	6370
Reading	4858	5584
Rochester	5987	7135
St. Louis	4454	4426
Salt Lake City	6354	3994
San Francisco	2979	2146
Scranton	5653	6572
Seattle	4924	3753
Spokane	6449	4954
Syracuse	5858	7123
Toledo	5965	6505
Trenton	4863	5787
Washington, D. C.	4146	4785
Wichita	4459	3908

†*September to June, inclusive.*




PER CENT OF NORMAL
DULUTH
LANSING
MINNEAPOLIS
DETROIT
GRAND RAPIDS
NEW HAVEN
PROVIDENCE
MILWAUKEE
DES MOINES
CLEVELAND
COLUMBUS
PEORIA
READING
ROCHESTER
ALBANY
BOSTON
BUFFALO
FT. WAYNE
HARTFORD
KANSAS CITY
SYRACUSE
PITTSBURGH
SCRANTON
TOLEDO
CHICAGO
INDIANAPOLIS
BALTIMORE
EVANSVILLE
ITHACA
LOUISVILLE
NEW YORK
OKLAHOMA CITY
OMAHA
PHILADELPHIA
RICHMOND
ST. LOUIS
WASHINGTON
NASHVILLE
SEATTLE
SPOKANE
DENVER
NORFOLK
1927-1928
1928-1929
1929-1930
1930-1931
1931-1932
1932-1933
1933-1934

Comfort Cooling with Ice

Utility report suggests that logical application is for short hour duty

A SUMMARY of statistical data collected by the Air Conditioning Sub-Committee of the Sales Committee of the Edison Electric Institute was presented on these pages in July.† The summary was largely confined to mechanical refrigeration.

The complete study also included some material on the use of ice for summer air conditioning. Tabulations were presented showing cost comparisons of ice and mechanical refrigeration installations at various capacities, electric rates, and ice costs.

The material which follows is extracted from the Institute Bulletin:

Ice as a means of refrigeration seems to have assumed its logical position in the air conditioning field as being applicable to installations which operate a comparatively short time during the cooling season. During the year of 1931, there were a number of portable cooling units designed for the use of ice on the market. Some of these were rather elaborate and also expensive for the results obtained from them. They ranged in capacity from about 1/10 to ½ ton of refrigeration. During 1932, the number of these units on the market diminished greatly.

The chief disadvantage of these units has been the size and bulky appearance, the difficulty in servicing them with ice, and the short time that they are effective with one charge of ice. These units, however, have a definite application and have been used to an advantage in offices only occupied a few hours a day and for emergencies such as illness.

A logical field for the application of ice to air conditioning in many localities appears to be the neighborhood theater which requires cooling for only about four hours per day. A number of these small theaters are equipped with ventilating fans and some have air washers with capacity—enough to take care of the refrigerating load when the water supplied to the washer is cooled by ice. Churches offer another good application for ice as well as dance halls, assembly halls and brokers' board rooms.

The manufacturers of ice and the utility are faced with the same problem; the promotion of air conditioning with refrigeration during the summer months. There has been considerable discussion as to the best method of cooperation.

Market for Ice Comfort Cooling

The challenge to the engineers of the air conditioning industry has been, and is, the development of equipment that may be purchased at a moderate price and operated at low cost. The evidence embodied in this committee report leaves no room for doubt that equipment and methods are already available to enable the air conditioning industry to meet the needs.

In addition, there is a tremendous potential market, a market that has hardly been touched, where either the prospects' ability to purchase is limited, or the

(Continued on page 74)

†"Air Conditioning Uses and Advantages Studied by Utilities," HEATING AND VENTILATING, July, 1934, p. 23.

PARTIAL LIST OF ICE COMFORT COOLING INSTALLATIONS IN OPERATION DURING 1933

Location	Name of Customer	Type of Establishment	Number of Seats or Volume of Cooled Space
Alexandria, Va.	Penn Daw Hotels	Restaurant	80
Baldwin, L. I.	Baldwin Theatre	Theatre	1,000
Baltimore, Md.	Harlem Theatre	"	
Bayshore, L. I.	Bayshore Theatre	"	1,700
Binghampton, N. Y.	Piccadilly Restaurant	Restaurant	166
Boston, Mass.	Tremont Theatre	Theatre	
Cincinnati, Ohio	Jackson Theatre	"	1,000
" "	Weil Funeral Home	Funeral Home	200
" "	Johnson Funeral Home	Funeral Home	250
Chicago, Illinois	Bal Tabarin	Night Club	
" "	Carder's	Restaurant	130
" "	Thompson's	"	400
Cleveland, O.	Stouffer's	"	450
Detroit, Michigan	Detroit Edison Co.	Farmer St. Office	57,000 Cu Ft
" "	" " "	Port Huron Office	100,000 Cu Ft
" "	" " "	Birmingham Office	
" "	" " "	Residence	17,000 Cu Ft
" "	Kay's Millinery	Shop	36,000 Cu Ft
" "	Ohio Pastry Shop	Restaurant	94,000 Cu Ft
Hammond, La.	Brackney's	Dance Hall	400
Hollis, L. I.	Hollis Theatre	Theatre	600
Hollywood, Calif.	Grauman's Chinese	"	2,050
Jacksonville, Ill.	Barr's Laundry	Laundry	
Kansas City, Mo.	Forum Cafeteria	Restaurant	370
" "	" "	"	204
" "	Hillcrest Restaurant	"	
" "	Lincoln Theatre	Theatre	700
" "	Ritz Theatre	"	980
" "	Waldo Theatre	"	1,040
" "	Westport Theatre	"	1,100
Laurelton, L. I.	Laurelton Theatre	"	600
Lexington, Ky.	Canary Cottage	Restaurant	230
Little Neck, L. I.	Little Neck Theatre	Theatre	600
Los Angeles, Calif.	Italian Village	Restaurant	278
" " "	Strand Theatre	Theatre	600
" " "	White Log Taverns (4)	Restaurant each	6,000 Cu Ft
Maxwell, Calif.	The Motor Inn	Restaurant	50
Merrick, L. I.	Gables Theatre	Theatre	600
Miami, Florida	Holsum Cafeteria	Restaurant	

Location	Name of Customer	Type of Establishment	Number of Seats or Volume
Minneapolis, Minn.	Barber Oil Company	Office	9,700 Cu Ft
" "	Kennedy Company	Beauty Parlor	15,500 Cu Ft
New York, N. Y.	Basque Tavern	Restaurant	275
" " "	Childs	"	400
" " "	City Hall Theatre	Theatre	500
" " "	Huyler's	Restaurant	125
" " "	Stanley Theatre	Theatre	600
" " "	86th St. Theatre	"	600
Pasadena, Calif.	Warner's Egyptian	"	900
Peoria, Illinois	Princess	"	552
" "	Wilton Mortuary	Funeral Home	300
Philadelphia, Pa.	Arcadia Theatre	Theatre	635
" "	Erlen Theatre	"	1,700
" "	Midway Theatre	"	2,500
" "	Stouffer's	Restaurant	360
" "	Stouffer's	"	300
River Forrest	Forrest	Theatre	1,400
Rochester, N. Y.	Wegman's	Restaurant	
St. Albans, L. I.	Island Theatre	Theatre	600
St. Louis, Mo.	Francis Bros. & Co.	Broker's Office	70,200 Cu Ft
Salt Lake City, Utah	Gem Theatre	Theatre	800
" " " "	Mayflower Cafe	Restaurant	60
" " " "	R K O Theatre	Theatre	2,200
San Jose, Calif.	Snellgrove Ice Cream	Confectionery	35
" " "	California	Theatre	
Sedalia, Mo.	Mission	"	
Springfield, Ohio	White Log Tavern	Restaurant	6,000 Cu Ft
Sterling, Col.	Liberty Theatre	Theatre	800
Stockton, Calif.	Bucholz Drug Company	Drug Store	70,000 Cu Ft
Sterling, Colo.	American	Theatre	600
Washington, D. C.	Pacific Gas & Elec.	Office	170,000 Cu Ft
" "	Rialto	Theatre	500
" "	Howard Theatre	"	
" "	Lincoln Theatre	"	
Wichita, Kansas	Occidental Hotel	Restaurant	250
" "	Raphael Theatre	Theatre	
Wilmington, Del.	Fox Uptown	"	1,440
" "	Fox West	"	550
	William Haines	Funeral Home	4,000 Cu Ft
	R. N. Hearn	Restaurant	3,000
	Hob Tea Room	"	3,000

Modern Unit Stokers for Heating

A discussion of kinds, features, competitive and commercial position, considerations and methods for use in selecting, the coal problem, installation, and service.

WHILE heating stokers of the unit type are by no means new, they have not passed the stage where a great amount of ingenuity is still being spent on their design. This is true in spite of the tendency of the underfeed type to overshadow the others so far as number of makes is concerned. In view of this it is worthwhile to briefly review the types and classes of these stokers.

Classification is usually on the basis of the method of placing the coal into position to burn. On this basis the several types are: 1—Horizontal feed; 2—Overfeed; 3—Underfeed. Each of these general methods has several variations and some of these can be described briefly.

Probably the best known of the variations of horizontal feed is that where the chain grate is used. In spite of the success with which this method has been applied to handling certain grades of coal under power boilers, it has not been popular for heating stokers of small size. So far as known, there is but one heating stoker of the unit type which makes use of this principle, although it is reported that others are in development. Heating boiler construction, being what it is, makes the use of a refractory firing arch difficult and ignition has proved a knotty problem.

One horizontal feed type uses a metal frame set horizontally to take the place of a grate. Coal is fed into this at the front and a series of reciprocating fingers sliding over each other, and peculiarly shaped, serve to gradually push the fuel along the grate as it burns. Ashes are dumped at the back.

Horizontal feeding does not lend itself to a circular shape of the grate and no such stoker is known at present. Since so many small domestic boilers and furnaces are circular, this fact has discouraged attempts to build horizontal feed stokers in the really small sizes.

Overfeed heating stokers can be roughly divided into two general classes: (a) those which are direct descendants of the familiar power stokers and use an inclined grate down which the coal gradually falls or is pushed, and (b) those which simulate hand shoveling by throwing or dropping the fuel on a grate. Those with inclined grates are suitable for rectangular fireboxes and have been used to a considerable extent under heating boilers in medium to large size buildings. Either side feed or end feed can be used and the typical application uses natural draft.

Although at least one power stoker used the throw-on principle some years ago, it is nevertheless looked on by many as a development due to heating practice. One reason for this is that this method can readily be used with a circular grate and thus lends itself especially well to construction for domestic installations. In addition it has other characteristics which have appealed to the fancy of many domestic designers. Thus it can be easily built portable, is readily put in place in the field, can use the existing grates, and permits either natural or forced drafts. In spite of these advantages there are problems. Even fuel distribution on rectangular grates is not easy and this has tended to limit overfeeds to round boilers of small size. Automatic ash disposal is difficult if not actually impossible, while some hand shaking of grates is usually necessary. Neither are these stokers able to handle all coals to advantage, for caking coals restrict the draft unless the fuel bed is agitated or broken up and this is not readily done except by hand. This combination of circumstan-

(Left) A Link-Belt stoker with coal chute for refilling hopper. (Right) Stokol stoker for heating an apartment house. In the summer it is used to heat service hot water.

ces has no doubt largely accounted for the present situation.

Very few new designs of overfeed stokers for heating purposes have appeared on the market recently and a number of those formerly offered have been withdrawn. This is so true that it may be stated that the present trend is distinctly toward the underfeed type.

Underfeed firing requires use of a forced draft and this permits securing a good mixture of air and fuel with a resulting high temperature in the firebox. Since the temperature may also be quickly raised and since the high temperature permits quick heat-up of the building, underfeed firing is looked on as being especially desirable for heating applications. The lists published in HEATING AND VENTILATING (pages 18-22) in the August, 1934 issue, give a good idea of the principal features of present-day underfeed heating stokers.

Here is a long list of stokers of essentially similar characteristics, at a variety of costs, backed by varying guarantees, and put on the market by makers of many degrees of background and experience. While the lists permit a good idea of what is available, they omit a great deal of important information which does not lend itself to tabular treatment.

The Heating Man Inquires

Two of the many important considerations to engineers, contractors, and dealers are: (1) How am I to know whether stokers have now reached a point in their development where I am justified in giving careful consideration to them? (2) Out of all those which I might use, how am I to go about making selections?

As the lists do not furnish an answer to either of these questions, let us turn attention to them. Neither question can be answered in a clear-cut fashion, but certain evidence is at hand and we can examine it in order to get as near a practical answer as possible.

In order to get light on the question of whether stokers are now worth serious consideration, it is necessary to know just where they stand.

We do not need to recall that the virtue of stokers with a forced draft over hand-firing of coal with natural draft, rests on the general arguments that (a) a better fuel and air mixture is possible, resulting in better combustion; (b) a higher furnace temperature and consequently, greater capacity from an existing boiler together with a quicker and more responsive fire, and (3) an operating saving in both labor and fuel. The stoker as a firing device to supplement hand-firing has been in use so long that there is ample evidence on these points.

As a device for firing strictly heating boilers, however, there are some additional points. Among these are the position of the stoker as regards ability to supply reliable firing automatically and to do this with safety and cleanliness; its position as a heating device competitive with similar ones for burning oil or gas, and the state which stokers have reached commercially as heating equipment. These latter considerations are those of most timely interest to heating men as they are really the ones which differentiate between stokers intended especially for use under heating boilers and those intended primarily for replacing hand-firing.

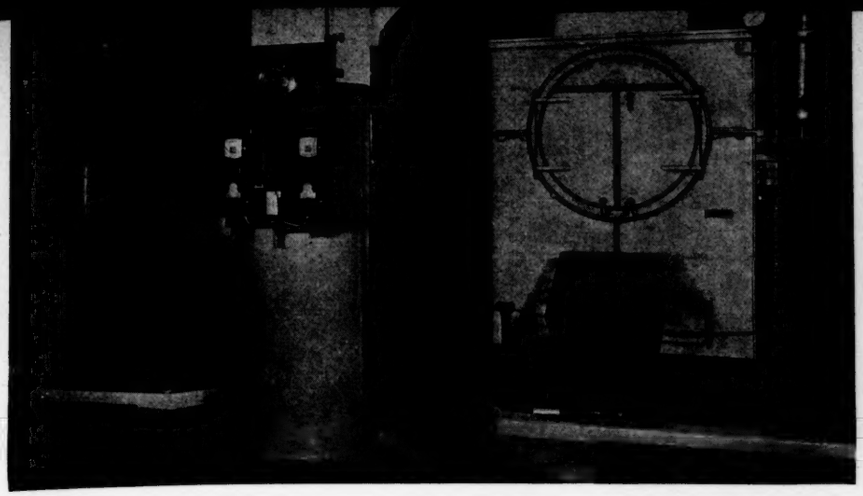
Features of Unit Stokers for Heating

Reliability and safety in operation are largely determined by the controls used. It should be recalled in this connection that controls have progressed to a point where almost any operation connected with a firing device can be accomplished under their direction. These controls can be used equally as well with stokers as with devices for burning other fuels.

Automaticity is now possible and practical with stoker-firing in heating plants. It cannot be said that it is accomplished either as readily or as often as with oil or gas burners, but it has been shown that substantially full automatic operation is possible with stokers. The typical heating stoker is still semi-automatic and requires attendance. Just how fast or how far full automatic operation will, or can be, developed and whether the typical stoker will eventually be an automatic device is not predictable. In many of its present applications it does not need to be. Keep in mind that aside from domestic plants, it is always questionable just how automatic the operation has to be made. The degree to which labor can, or has to be, eliminated in any plant is one of the points which should be given careful attention when a fuel and a burner are under consideration.

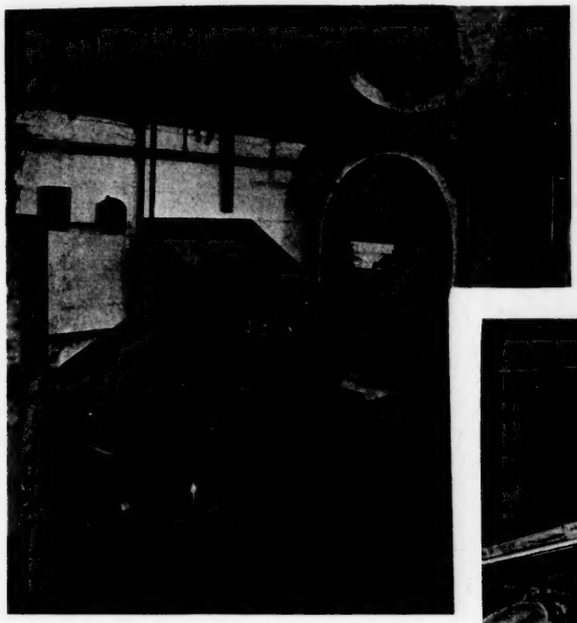
That the nature of coal makes cleanliness harder to secure than with the use of oil or gas as a fuel is self-evident. The important question is whether, at the present stage of practice, coal fired by stokers is used cleanly enough to warrant our consideration. The answer is yes. This does not imply that there is no dirt. The matter of dirt, or rather of cleanliness of operation, is one which, like automaticity, should be looked into carefully. There are degrees of cleanliness, and the limitations of satisfactory cleanliness certainly differ for various types of buildings. It is ridiculous to conclude offhand that every plant should be equipped with the care required in a high-grade residence. Many buildings, especially those operated commercially, simply do not justify expense to obtain refinements in cleanliness in the boiler room. In places where dust or dirt is obnoxious enough to warrant it, stokers can be equipped with covered conveying apparatus for both coal and ash. Use of these appliances and of the other possibilities, such as chemically treated coal, makes it possible to burn coal with stokers with such absence of dirt that the most fastidious tastes need not be insulted. Present equipment permits a choice ranging all the way from hand-filling of the hopper with low-grade coals and hand ash removal to fully automatic operation with highly prepared coal. The practice of providing for melting the ash to clinker, much used where bituminous coals are fired, is not only a labor-saver but also removes much of the tendency of the ash to fly. While not strictly correct, it may be stated that this method of ash disposal is one of the developments which have come about with the application of stoker-firing to heating furnaces.

Another phase of cleanliness is the nuisance of the puffback which was all too prone to occur with the early heating stokers, especially those where the firing was distinctly intermittent. Where coals having a high gas content were used, starting the stoker mechanism

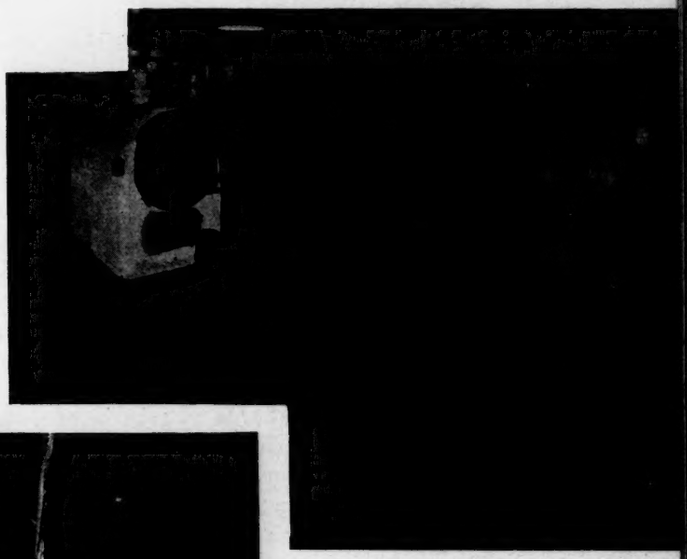


(Above) Twin installation of Brownell stokers. Note instrument board and guard chain and curbing on pits.

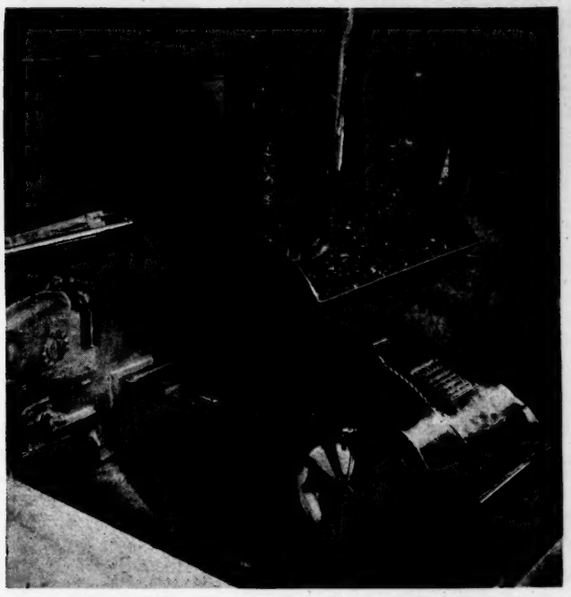
(Above) Side installation of Franklyn stoker under a cast-iron sectional heating boiler.



(Above) An Econocol stoker with hopper set against wall for convenience in refilling.



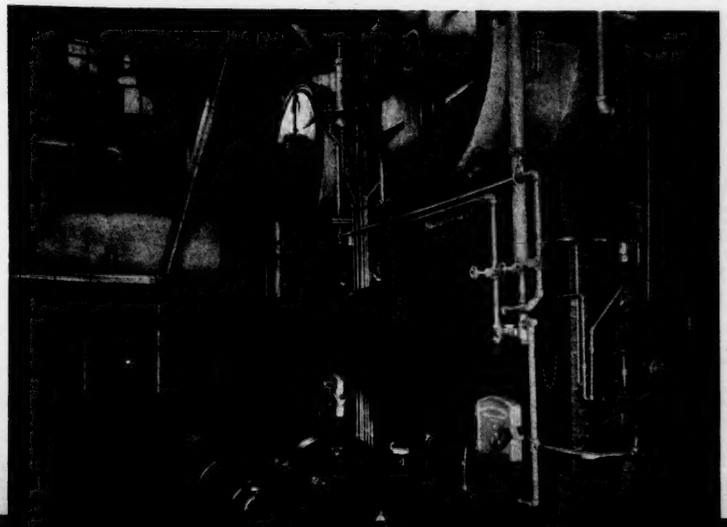
(Above) A Motorstokor which automatically takes coal from pile and places ashes in covered cans.

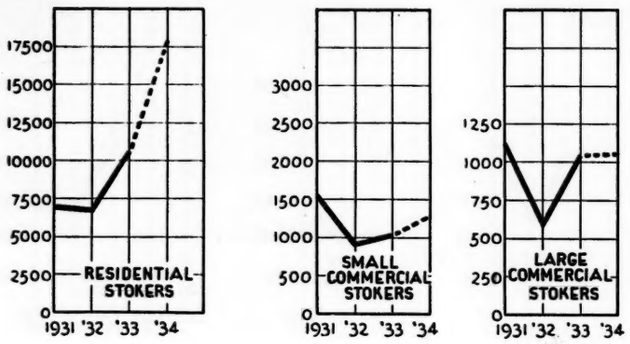


(Above) Combustion Engineering Type S stoker installed under an 80-hp. boiler in a Pittsburgh ice cream plant.

(Below) Two 200-hp. boilers fired by Riley-Jones stokers. Plant is used to heat educational institution.

(Below) Two views of a Detroit UniStoker showing unusual method of refilling hopper. Installation is under 125-hp. boiler.





Stoker sales

was often a signal for a puffback of the gas accumulated over the fire-beds. This caused a sudden pressure which would relieve itself through the hopper and produce a cloud of gas, ash, and dirt in the boiler room. It is the same kind of puffback which has been known to occur when intermittent burners are operated with either oil or gas as a fuel, or when hand-firing of coal is practiced intermittently. Means for preventing this were among the problems which had to be solved when oil and gas were being adapted to heating plant requirements. In the case of the stoker, several methods of prevention are in use. One is to fit the hopper with a tightly fitted cover to prevent the gas relieving itself through this path; another is to take in all or part of the combustion air through the hopper; a third is to divert part of the air from the fan outlet to a point near the entrance to the retort; while a fourth is to connect the coal passage near the retort with the chimney draft.

Safety should be considered from two angles since the danger attendant on heating plant operation arises from two sources. One is the danger resulting from overheating of the boiler or furnace, while the other arises from the presence of a body of combustible material. The way to eliminate the danger of overheating is to equip the plant with suitable sensitive automatic controls which will cut off the burner and stop the fire before a dangerous condition is reached. The well-known stack temperature and low-water cut-off devices are means used for doing this. They can be, and are, placed on stokers easily and are as effective as when used with any other fuel or any other means of firing.

Fuel danger varies both with the amount of fuel on the premises and on its combustibility, as well as on the means of storage used. Coal is relatively incombustible compared with either oil or gas, and when stored with reasonable care, is not considered dangerous. On the side of safety, coal fired by a stoker compares favorably with any available fuel or firing method.

Stokers vs Oil and Gas Burners

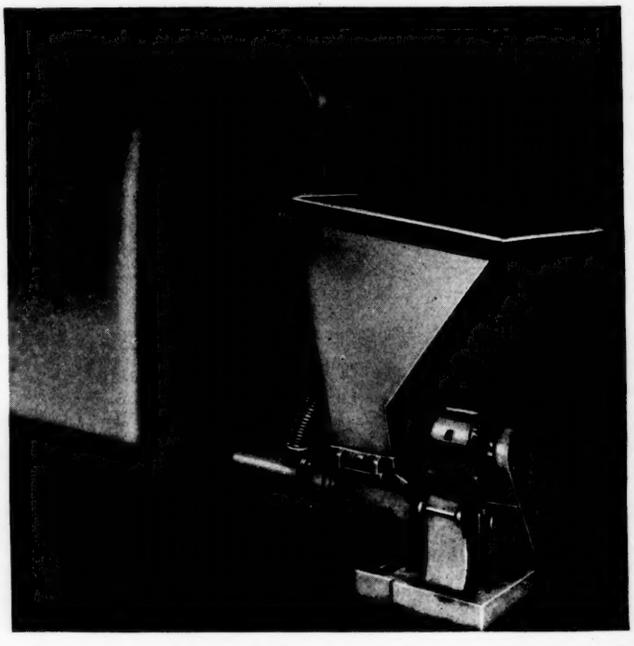
Now we can give consideration to the position of heating stokers as devices competitive with similar ones for burning oil or gas. To do so intelligently it is necessary to keep in mind that there are really two distinct cases and not one, as is so often supposed. One case is that of domestic applications where convenience, automaticity, cleanliness, and safety are usually of more competitive importance than either first or operating costs. The other is the application where cost is the prime consideration and usually occurs in commercial plants of all kinds.

As a domestic device the unit stoker has been at a competitive disadvantage with oil or gas-fired burners largely because of the following reasons:

(A) Its late start in the field has not permitted quantity production to be achieved on a scale comparable with that reached by oil and gas burners. Consequently, strong distributing sales and service organizations have been possible in only a few cases because of either lack of capital or absence of volume—a situation which has necessitated comparatively little sales pressure and advertising at the same time that failures of early experimental installations were still fresh in mind. These several factors have all had their part in keeping up the first cost of the stoker.

(B) The importance of cleanliness and full automatic operation as factors in domestic sales was realized but slowly. Even after the realization, results were further slowed up by the difficulty of accomplishing full automaticity without increasing the first cost to a point where the stoker could not compete. So also was it difficult to make headway with the troublesome cleanliness problem because of the fuel situation. Coal producers were set in their ways and their production facilities were fixed and could be changed only by expensive plant changes. As a result, stokers have had to use such coals as are available and they were often not prepared with an eye to domestic stoker applications where low ash and clean handling methods are at a premium.

(C) Fuel costs have hindered the stoker in the competitive situation surrounding domestic use of coal, oil, and gas. So long as stokers have had to concede something to oil and gas as regards cleanliness and automaticity and have had a hard time matching their first costs, it has been necessary to dwell on safety and operating economy as their chief advantages. The strength of the operating economy argument is directly dependent on the comparative fuel cost. In certain



Holcomb and Hoke stoker with tube for removing gases from coal feed tube.

localities it has actually been true that the cost of a season's coal supply was greater than the cost of oil for a similar installation.

At present there are several producers of domestic stokers who are in quantity production with wide distribution and service organizations, aggressive selling methods, standardized and automatic stokers, and with first costs in line and competitive. Coals specially prepared for stoker use are available and are handled in some places with cleanly care and painstaking service at attractive costs. Within recent months there has been a tendency for oil prices to rise more sharply than coal and each rise strengthens the operating economy argument of the domestic stoker.

In commercial plants heating stokers have done much better against the oil and gas competition than in domestic plants. In fact there is a large group of stoker men who believe that this field is the one which is the most promising for stokers. Gas and oil are serious competitors only in limited localities where the price situation gives them an advantage. The principal competition is between hand-firing and stoker-firing of coal. As the problem is so largely one of cost it is susceptible to analysis and determination much more readily than in domestic installations where costs cannot be allocated to advantage because of the absence of records and the imponderables which are present. The problem usually resolves itself into determining whether the operating savings will result in the stoker paying an attractive return on the investment. The investment can be readily found by asking for bids. Operating savings, however, cannot be found until the labor cost and the cost of the coal are definitely known.

In order to realize the best saving possible on the fuel it is necessary that the stoker be able to handle almost any grade of coal and burn enough to carry the rating. This has made the matter of fuel selection one of the troublesome problems and one which calls for detailed knowledge of the operating characteristics of the stoker. Manufacturers have recognized the nature of the problem and are prepared to offer advice as a part of their regular selling effort. Labor saving has to be studied for each job as it is complicated by legal requirements and by the practice of giving part time attention to operation.

A judicious choice of operating and safety controls will permit the maximum of labor saving. If attendance can be had at slight cost it is evidently not economical to equip the stoker with expensive automatic controls, but in most cases installation of some controls is indicated. Knowing labor rates and the operating schedule, the question of what controls are justified can be readily answered. In most low-pressure plants substantially complete operating controls are used as these plants do not require the full time presence of an operator. Occasional attendance to fill the coal hopper and to dispose of ash is all that is necessary. While these plants can be and are fitted to operate from room thermostats, they often operate to maintain a steady steam pressure or a fixed hot water temperature and use a graduated control of the rate of feeding coal instead of employing intermittent action of the stoker. Typically they do not need a covered hopper or automatic filling of the hopper or disposal of the ash.

At present there are stokers built in a unit and intended specifically for commercial heating applications. The problems encountered in selecting and operating such stokers are as old as the automatic stoker itself and have received such continuous attention that virtually all makers of any standing are well equipped to furnish assistance in their solution. The current price situation of coal and oil is also worth careful attention as any differential increase in oil price over that of coal is of significance in those localities where there is competition between these fuels for use in commercial heating.

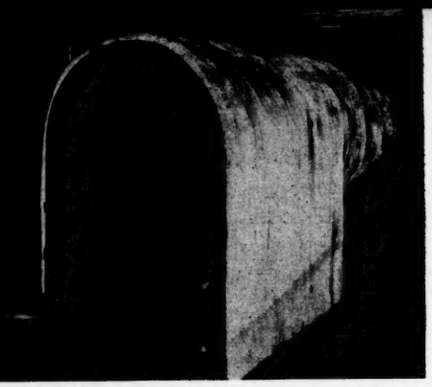
In general, then, the stoker as a competitive burner with those using oil or gas as a fuel is now in a position which warrants a careful study and thorough knowledge of what is to be had, the relative results to be obtained, and the comparative costs involved.

Commercial Status of Heating Stokers

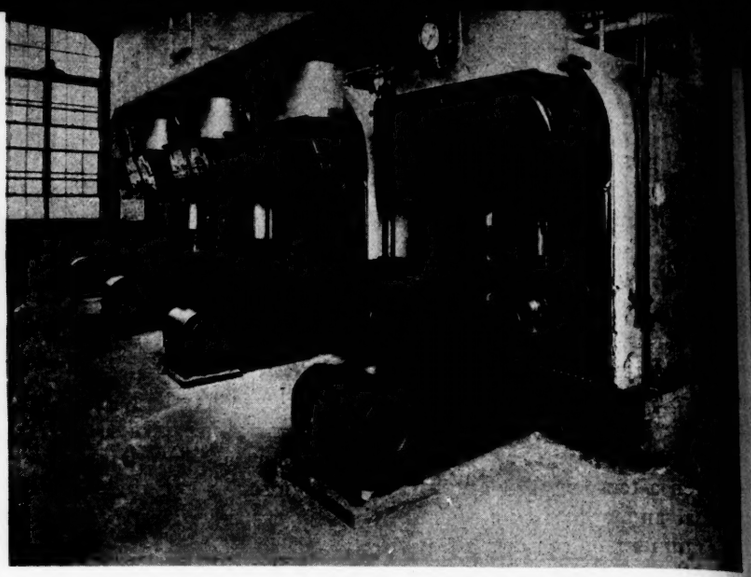
It is not possible in limited space to outline or discuss many of the aspects of the present commercial situation relating to the use of stokers as heating equipment. As our principal interest at present is to learn whether the state is such that it sheds any light on the general question of whether or not they are now worth the attention of engineers, contractors, and dealers, we will confine discussion to those phases only.

There is no well defined point in the commercial development of any form of heating equipment at which it may be stated that the equipment becomes definitely worth careful attention. Some will want to give attention to it from the very outset, others when it passes various stages. In general, a rough statement is that the great body of engineers and contractors will consider it worth attention when it reaches a position where they feel justified in recommending it to clients and be prepared to install it and stand behind its ability to perform. Dealers consider that the point is not reached until the equipment can be sold by their organizations without prohibitive effort and without disastrous comebacks because of operating failures on the job. In other words, all are agreed that they are not particularly interested until after the experimental and field trial period is passed. Unfortunately, there is no exact way of finding this point, but there are several indicators which can be used to advantage.

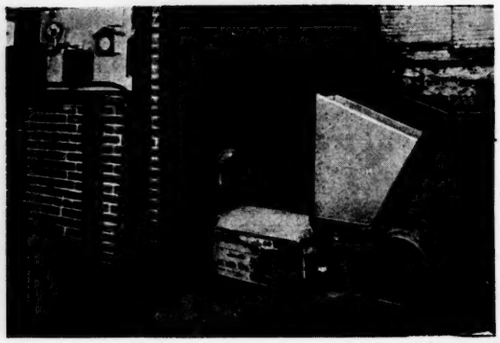
One of these is the number of installations made. When a sizeable number of units of heating equipment have been in actual operation on the job for a considerable period it is considered safe to conclude that the operating "bugs" have been found and eliminated. Evidence of the present situation in this respect is included in the accompanying chart. The curves are based on the reports of the Department of Commerce for the past three years and projected to cover the remainder of 1934 on the assumption that the reported percentage gain for the first part of the year will hold throughout. It will be seen that during these years these reports account for upward of 40,000 residential, 4700 small commercial, and 3600 large commercial stokers sold and installed. There is thus evidence that there are upward of 50,000 installations at present and in view of their size it is certain that the great majority are in



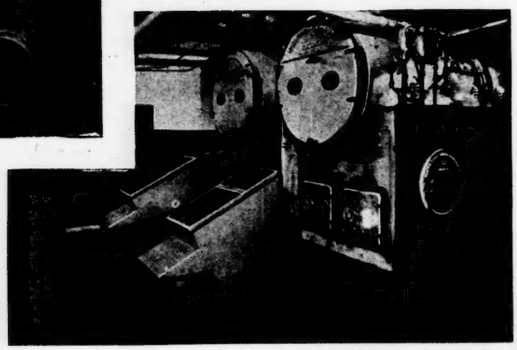
(Above) An unusual installation in a dairy. A Stoker Products Simplex stoker installed at an angle.



(Above) A battery of four 132-hp. boilers fired by Detroit LoStokers in a large warehouse.



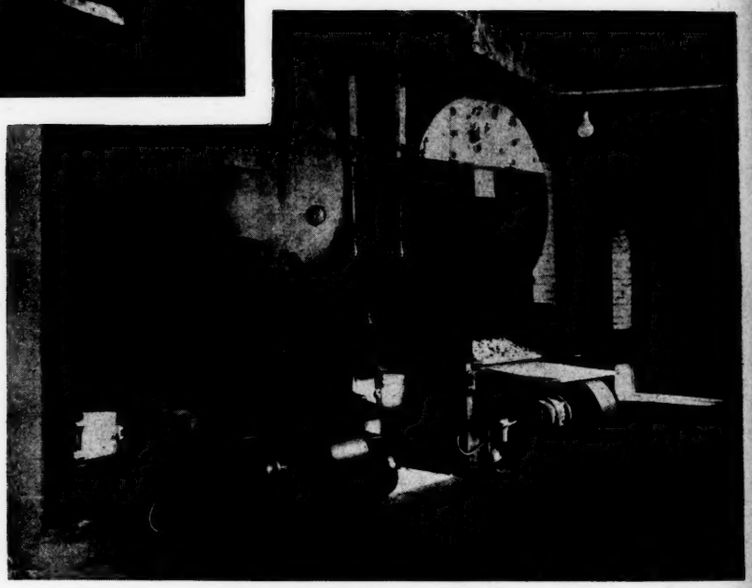
(Above) Twin installation of Iron Fireman. Operating controls in foreground.



(Left) An especially trim looking installation of two Iron Fireman stokers in a warehouse.

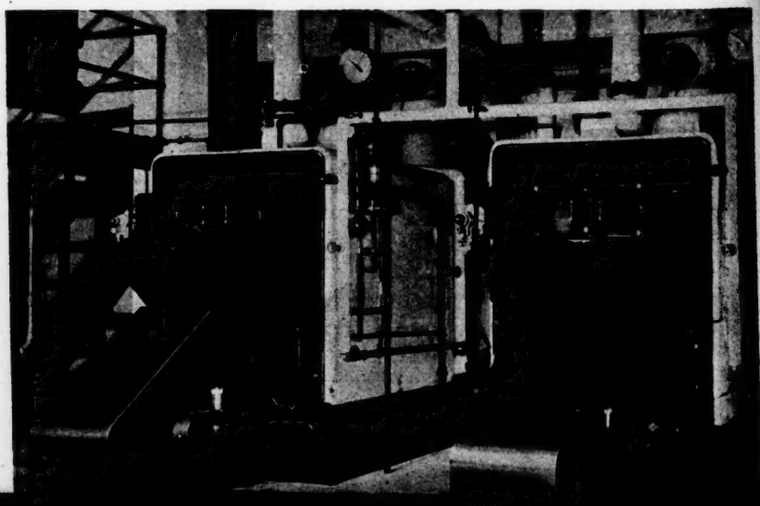
(Above) A double installation of Combustion Engineering (Type E) stokers in a suburban New York apartment.

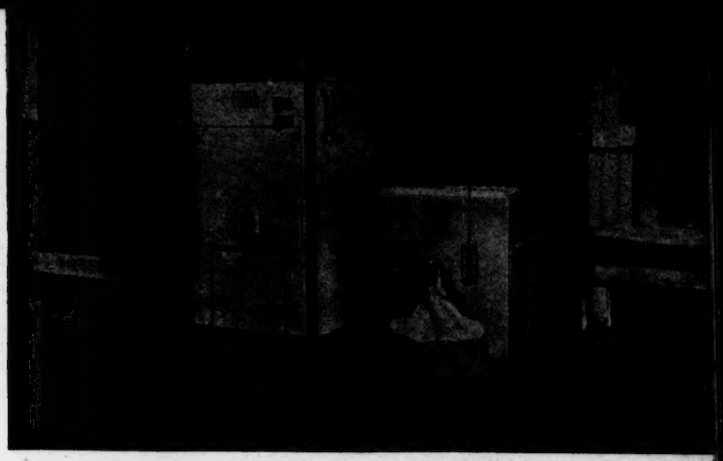
(Below) A battery of four Peabody Stokers which have been in operation since 1929.



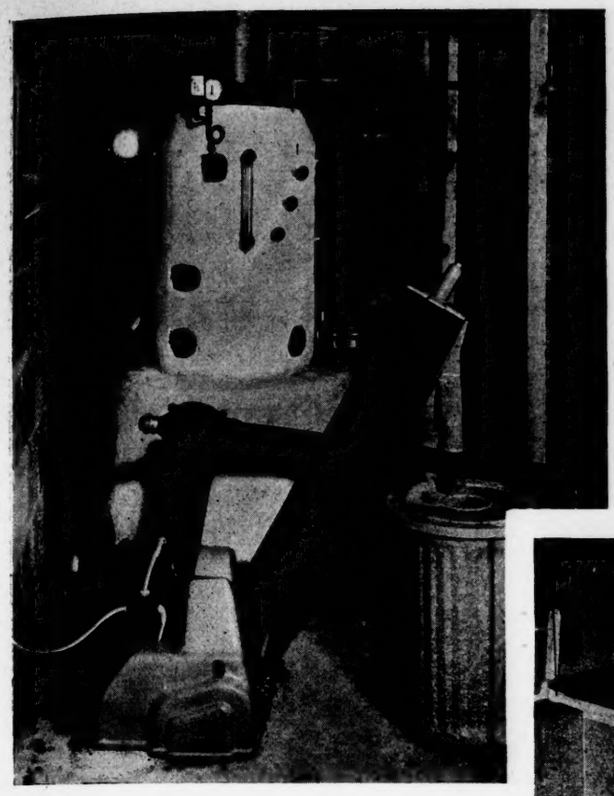
(Above) Two Whiting stokers which feature horizontal compression feed. Operating mechanism is mounted on door which opens for ash removal.

(Below) Two Spencer stoker-boiler units installed in a Baltimore school. The stokers are of the hydraulic ram type.

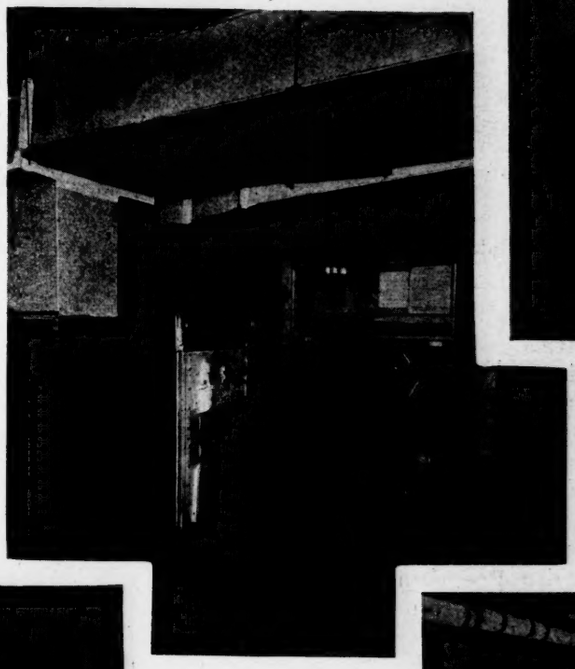


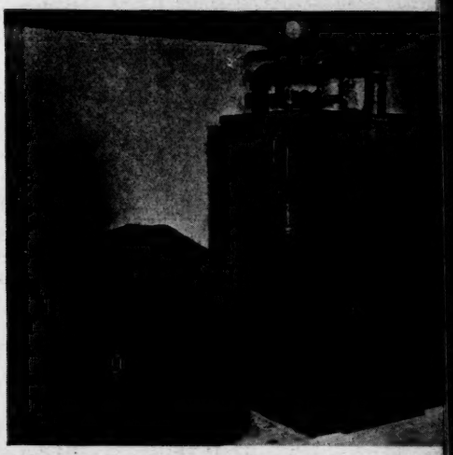


(Above) Electric Furnace-Man stoker installed in a specially designed boiler. Both stoker and boiler are finished in white enamel.



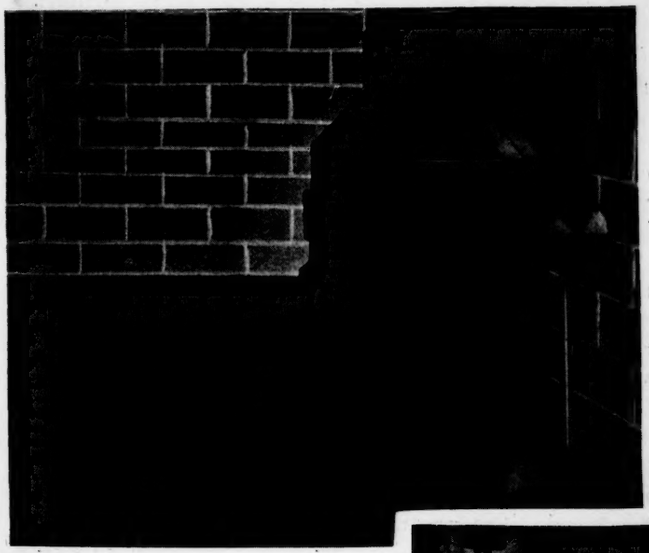
(Above) A completely automatic stoker which takes the coal from the bin and deposits ashes in covered can. Motor-stokor Corporation.





(Above) Side installation of Burnwell stoker in a domestic heating boiler.

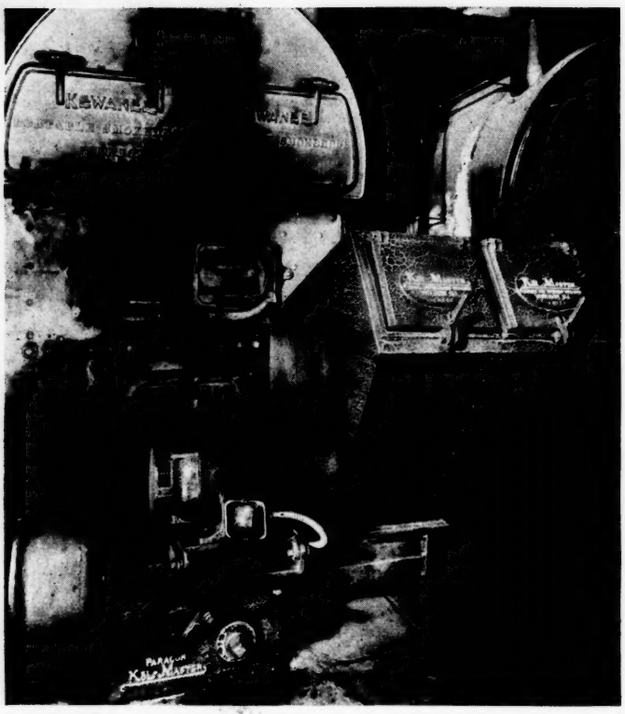
(Right) Warm-air heating plant in a pit with Simplex stoker at original floor level.

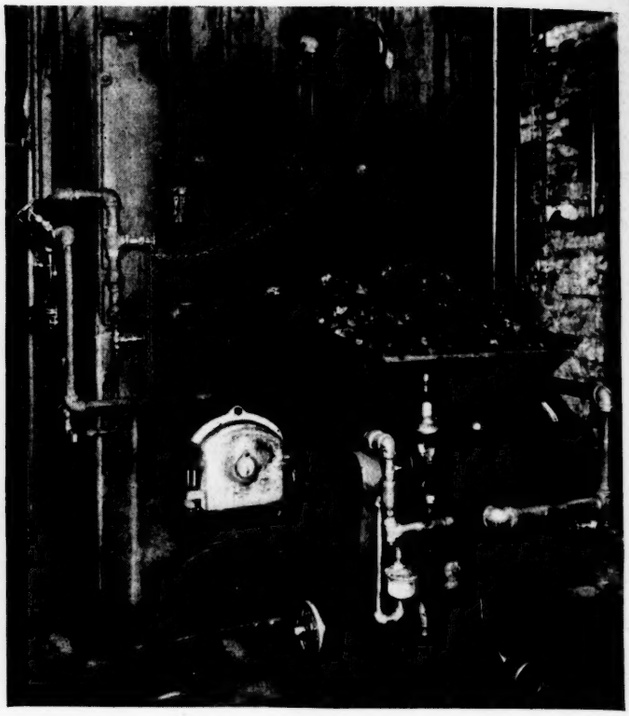


(Above) A domestic model Butler stoker as used with a warm-air heating plant.

(Above) Steam boiler fired by Frederick Home stoker. Control instruments on rear wall panel.

(Left) Stokol stoker of Schwitzer-Cummins installed





(Left) Paragon Kol-Master stoker with an offset hopper. (Right) A hydraulic drive piston stoker by Brownell installed under a heating boiler

heating plants. Estimates differ as to the actual number now installed and operating. It is known that the reports do not include all makers, and some estimates place the actual figure as high as 200,000. Wherever it may lie between these limits there is no denying that a sizeable number are in operation, probably enough to warrant the conclusion that the great majority must be operating satisfactorily.

Another piece of evidence of when the experimental stage is past is usually found when there is a decided trend on the part of all makers to move toward a given type. It will be recalled that this was strikingly shown in the case of the oil burner and the gas burner. Now that the underfeed with motor, fan, and control attached is coming to be adopted by more and more stokermakers there is reason to believe that the trend is well under way. The usual story from that point is a concentration on perfection of detail and on securing quantity production.

We believe that even the most conservative will agree that the unit stoker especially adapted for heating applications is now worthy of careful attention when a fuel and a burner are under consideration.

How to Select

When one starts to look over the imposingly long list of these stokers, however, with a view to making a selection, the very length of the list is disconcerting. How to choose?

As with nearly all heating equipment there are several general methods. The one most engineers and contractors prefer is to depend on their own experience. With so many makes of stokers and with the recent appearance of many of them, it is evident that few will be able to use this method until such time as there has been an opportunity to collect the desired experience. This method is therefore not feasible to a great many. This leaves available either or both of two general procedures. One is to depend entirely on the reputation and known character of the stokermaker, to lean heavily on him and his experience, and to exact performance figures and guarantees. The other is to take into account the reputation of the maker and to supplement this by a careful analysis of the stoker itself and the conditions under which it will be installed and operated. On the whole, the latter method is probably not only fairer to all concerned but is the one which most engineers and contractors will prefer to use.

In the great majority of cases examination of actual operating stokers will not be possible, for there are few communities in which there are installations of all makes of stokers. If you wish to look into the mechanical details, methods, and materials of construction used it will be necessary to depend on catalogs, on information secured direct from the maker, or on statements of testing laboratories. When the choice has been narrowed down to a few makes by such a method the final selection can be made by local and particular considerations such as price, service, guarantee, and similar ones.

In examining the specifications of a stoker it is well to look into each major part separately since the whole assembly is no better than the parts of which it is composed. The parts are: retort; coal feeding mechanism; air feeding equipment; motor and power transmission; ash disposal devices; controls, including both safety and operating.

Retorts

The retort provides a place for receiving the coal from the feeding mechanism and gets it into position to mix with the air for combustion. Retorts are anything but standardized and there are so many ideas that

a superficial examination of the shape and proportioning will show little or nothing to anyone short of a stoker specialist. Commercial designs are for either round or rectangular boilers. Suitable tuyeres (holes) for admitting air are incorporated. Size, spacing, and arrangement of these holes are immensely important but examination is of little use to one who is trying to choose a stoker. Materials and workmanship should be carefully noted. The retort and its connected plates are subject to high temperatures and to severe temperature strains. They must be sturdy in order to stand up. There are no simple checks to be applied.

Coal Feeding Mechanism

This consists of the whole train from the hopper or the bin to the retort. Here also methods are diverse. The screw is by all means the most popular on the smaller sizes. It may be either continuous or intermittent and either of regular or irregular pitch. It should deliver the coal to the retort without breaking it during the process and should distribute the coal evenly over the whole retort. It must also exert enough push to force the coal over the tuyeres into the burning zone.

Reciprocating plungers are the other principal device used. These plungers may either be moved by a crank or may be direct-connected to a cylinder and piston actuated by oil or water pressure or by steam power. Use of steam-driven cylinders is rare with heating plants and virtually out of the question in low-pressure work. Electric drive may be used with either oil or mechanically-operated plungers. The function of the plunger is exactly the same as the conveyor screw and they are alternate arrangements for accomplishing the same results.

As in the case of the retort, the engineer or contractor interested in stoker selection will find few concrete facts on which to base a judgment. The recent trend toward screws is no doubt largely influenced by considerations of simplicity, compactness, and cost, especially in the small sizes.

Hopper design and size must meet the requirements of the coal. This is largely a matter of design detail. With many coals it is necessary to agitate the supply in the hopper to prevent clogging and failure to fall on the conveying mechanism, especially when the coal is wet. The means for doing this should be noted. Sturdy construction of the hopper is desirable. Capacity should be adequate to meet the attendance available. With the dimensions known the adequacy can be readily checked by simple computation. For domestic stokers using anthracite the Anthracite Institute suggests a standard of capacity at not less than 15 times the maximum hourly rate of coal feed.

Air Feeding Equipment

Centrifugal blowers are necessary because of the pressure encountered in forcing the air through the fuel bed resistance. Naturally, this resistance varies with the kind of fuel used, the depth of the bed, and the rate of firing. The fan must be of adequate capacity to furnish sufficient air at the maximum firing rate and against the maximum resistance. This requires that there be some means of adjusting the flow. Dampering at constant speed and variable fan speed are both practiced. Where the stoker is of the unit type with one driving motor, speed variation is seldom feasible and damper or volume control is the means used.

The importance of good and accurate control of air volume is a point often overlooked. It is worth close attention and the means provided should be carefully noted to satisfy yourself as to its practicability over a considerable range.

Good mechanical construction with a suitable mounting is important and where absence of noise is desired these details should be examined.

Devices for preventing a back flow of gas to the hopper are in fairly common use. One kind diverts a part of the air from the fan and delivers it at fan pressure to a point in the coal feeding mechanism near its entrance to the retort. Another kind provides for drawing a part of the air supply to the fan from the inside of the hopper. If none is provided, the reason should be asked, and the effect of its absence should be considered.

Motors

The driving motor of a unit stoker is one of the most important parts in the whole device and its type and capacity should be checked. If too large to operate at or near its rated capacity for any considerable period the power consumption may be excessive because the efficiency of the motor falls off at points other than that at which it is rated. If too small it may stall or fail otherwise at the peak load when dependable operation is most necessary. If of the wrong type it may draw excessive starting current.

Reports of laboratory tests where the power can be accurately measured show great differences in the consumption of different makes of small stokers having the same coal capacity. These differences are due to: (1) wrong size or type motor, (2) wrong size or type fan, (3) differences in efficiency of the power transmission devices used. As the difference in power cost is sometimes enough to seriously affect the expected savings it is well worth while to attempt a check. A rough figure can be obtained by using the following equation.

$$\text{Kw-hr. per ton} = \frac{1492 \times \text{Motor hp. rating}}{\text{Coal feed (lb. per hr.)} \times \text{Motor efficiency}}$$

If this equation is applied against two different makes of stokers at the same coal feed rate the resulting figures will be rough indexes of their relative power consumption at that feed rate. It may be applied at as many feed rates within the capacity of each stoker as desired, provided the characteristic curve of the motor is available. When such a curve is not at hand the motor efficiency at coal feeds off the maximum may be assumed at 0.65. Results obtained by such an assumed efficiency should be used with care. The only reliable figures for power consumption are those found by actual tests during operation.

Where, as is frequently the case, the motor runs in a dusty atmosphere, an enclosed or semi-enclosed motor should be used. In the smaller models and especially

in those intended for domestic use, the capacitor motor is a favorite because of its freedom from radio interference, absence of high starting current, and the long hour use expected of these machines. Reservoir lubrication is desirable in order that attention may be at a minimum. In the domestic models suitable mounting for quiet operation is a point which should be noted.

Speed Reduction

So many ways of reducing speed can be used that naturally there are about as many boxes for accomplishing this as there are stoker makes. Worm and wheel combinations are common. The device commonly includes some method of accomplishing at least one speed change, and in some cases a number of operating speeds can be secured. The efficiency of power transmission varies considerably with these devices and this point should be investigated and evaluated so far as possible. One type of device contains nothing but rotating gears and pinions and the motion imparted is continuous. Another includes a ratchet and pawl device and imparts an intermittent motion. Additional points include adequate provision for lubrication, quiet operation, materials used, and sturdiness of construction.

Ash Disposal

Where ash is disposed of automatically it is picked up in its usual form of fine particles and handled by a conveying device using either mechanical or air propulsion. To use this method the coal should have a high enough ash-fusing temperature so that the ash will not melt and solidify on cooling. The ash is deliberately fused in some stokers, especially those of small size for burning bituminous coals. Disposal is by hand. Evidently there is no object in having automatic disposal equipment unless the coal would lend itself to this method of handling the ash.

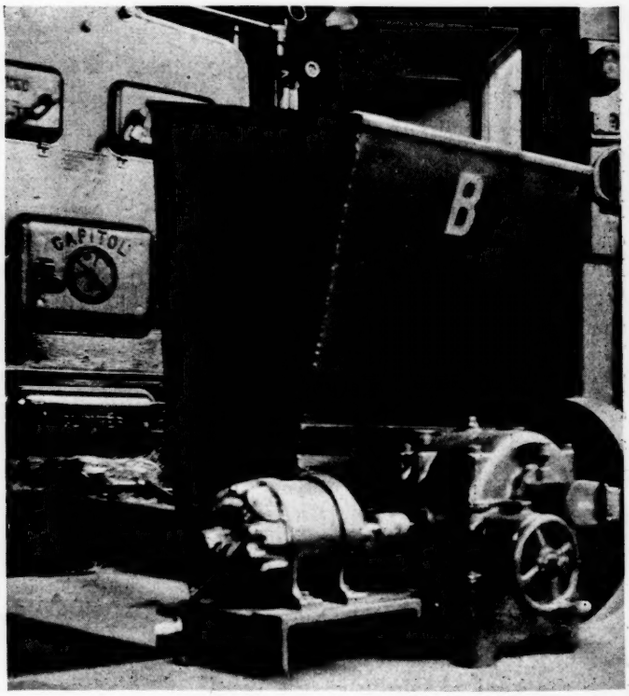
Controls

Control must be both adequate and effective. It must operate to secure saving in operating cost, be as automatic as the installation requires, and make the operation safe and free from nuisance.

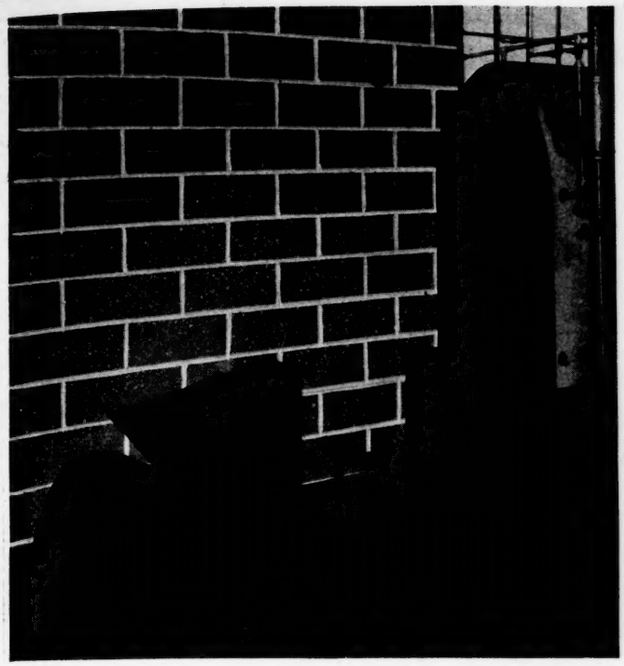
The principal automatic safety controls are those which prevent overheating and the resultant fire risk and those which prevent firing a dry boiler. The overheating limit control operates to stop the stoker when the temperature (usually at the stack) reaches some predetermined safe value. The stoker cannot start again until the temperature is reduced, regardless of other conditions. So also the low-water limit takes control and stops the operation if the water level falls below a fixed safe point.

Air thermostats are commonly installed with stokers and the simplest application starts and stops the stoker. Other applications cause the thermostat to open and close valves in the mains or at radiators, in ducts, etc., without affecting the starting or stopping of the stoker directly. In these cases the stoker itself usually operates under pressure or temperature control. The methods and devices used for this purpose do not differ in principle from those used for other firing methods and other fuels, and can be considered quite apart from the stoker or its selection, if desired.

There are several operating conditions which are peculiar to heating stokers, and automatic controls to take care of them have had to be developed. One is the case where thermostatic starting and stopping in mild weather would let the fire go out because of the



(Left) Combustion Engineering stoker. Control panel on rear wall. (Right) Breeding stoker. Motor and speed reduction in front.



A Butler stoker installed under a steam heating boiler

long off period, and another is the case where the fire goes out for some reason while there is still coal in the hopper. In the one case a time-operated device may be inserted to start the stoker at set intervals and allow it to run long enough to keep the fire going regardless of the demand for heat. In the other case a temperature sensitive element stops the stoker motor when the temperature of the flue gases falls so low that the fire is evidently out or cannot be restarted without rekindling. Without this control coal would continue to be fed into the retort even though the fire were out. Still another possible condition arises when the stoker becomes empty through oversight. Another control is available which shuts off the stoker under such a condition.

Where stokers are used to keep up a steady pressure with a varying load, as is often necessary in larger plants, control by varying the feed rate automatically is widely practiced rather than using the start-and-stop principle. Here is where adjustable lengths of stroke on plunger feeds or change of the number of strokes per minute is especially adaptable. Controls to accomplish these results which are peculiar to stoker operation of this kind were largely developed for power boiler practice, and adapted for heating installations.

Enough has been noted to make it clear that the problem of proper controls is complicated except in those cases where substantially full automatic operation is required—a case occurring typically in residences. Here the problem is to check to be sure that the controls are substantial, well thought out to give coordination and interlock, and include all the automatic and safety features desired.

The control problem from the standpoint of engineer and contractor is not complete, however, with an examination to note *what* is included and how well it is made. It is quite possible to equip a plant with the best of controls and to use sufficient of them and still not get the results desired because the whole plan of operation is not well thought out and the controls properly coordinated. This is especially true where operating conditions are off standard. Such jobs should be distinctly treated as special.

One point which should be especially examined is the coordination between rate of coal feed and rate of air supply. If the controls are separate they must be so arranged that the proper amount of air is supplied. If automatic they must be closely interlocked. There are a number of control devices to accomplish this.

It will be seen that analysis of the mechanical features of a long list of stokers in order to make a selection is a tedious matter. Some of this can be avoided in the particular case of underfeed domestic stokers using anthracite fuel by recourse to the work of the Anthracite Institute Laboratory. This laboratory has drawn up an approval code which includes construction requirements, operation requirements, and installation requirements.[1]

The Coal Problem

Selection of a stoker cannot be done intelligently without considering the coal to be used with it. The reason why this is a problem is simply because every stoker will not handle every coal. In fact, the range of coals which a particular stoker can handle economically is usually restricted. So also is the supply of suitable coals usually restricted in each locality. With limited building space and the high cost of providing large storage it is not feasible to plan on using coals which are not readily and normally available on the local market. To realize its possible and intended economy the stoker is usually also expected to handle successfully a low-priced grade of coal. If it will handle nothing but the higher-priced grades available there will be eventual dissatisfaction. Therefore, the coal problem in selecting a particular stoker to do a specific job in a given locality is to be sure that it will operate with the low grade coals available *there*, or at least with a cheap enough fuel to permit it to realize a fuel saving. The best evidence on this point is successful local installations using the kind and grade of coal in question. In the absence of such installations recourse can be had to an analysis and a conclusion based on judgment, or to securing guarantees. Unless the guarantee is absolute, however, it will prove of little value for there is no satisfaction in discovering after the stoker is installed and paid for that a high-priced fuel must be used in order to get it to work or to handle the load. Reputable makers with adequate experience know the fuel limitations of their stokers and can be made a source of valuable assistance in this connection.

Again, the domestic situation is peculiar to itself. Economy does not have to be the governing incentive and the fuel used does not have to be low-grade, although under present conditions, even in domestic installations, cost is a powerful factor.

(Continued on page 77)

[1]Cooperatively with Anthracite Institute and others interested, a Commercial Standard for underfeed domestic burners for Pennsylvania anthracite has been drawn up under the procedure of the Bureau of Standards, Department of Commerce. It is known as CS 48-34, and became effective on August 1, 1934. For information address the Bureau.

Hook-ups for House-Cooling Systems

A selective cooling system for a residence using a central duct system has been discussed on these pages.[1] This system consisted of a centrally located cooling unit with supply and return ducts to various portions of the house, and electrically-operated dampers in the ducts transfer the cooling effect from one part of the house to the other as desired.

This arrangement has disadvantages and there are other possible means of cooling. The draw-

[1]See "Selective Cooling for Residences," by J. F. Lamb, HEATING AND VENTILATING, May, 1934.

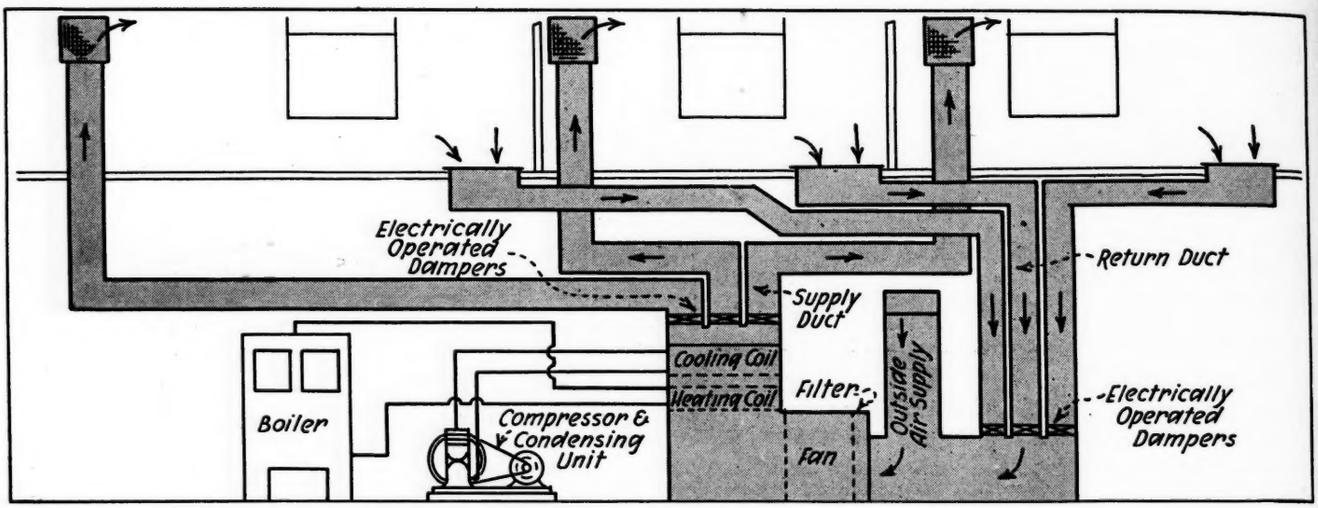


Fig. 1. CENTRAL DUCT SYSTEM

Features—Centrally located cooling unit, supply and return ducts to various parts of the house, electrically-operated dampers in ducts to transfer cooling effect to different parts of house. Supplies heating and cooling. *Advantages*—Flexibility. Control from switches at various points, limited refrigeration capacity required, as cooling can be switched to sections of house being occupied. *Disadvantages*—Cost of complications of ducts and dampers. Loss of cooling in air while being distributed. Large ducts needed for cool air. *Options*—Use warm-air furnace as source of heating. Use ice, well water, or steam jet for source of cooling.

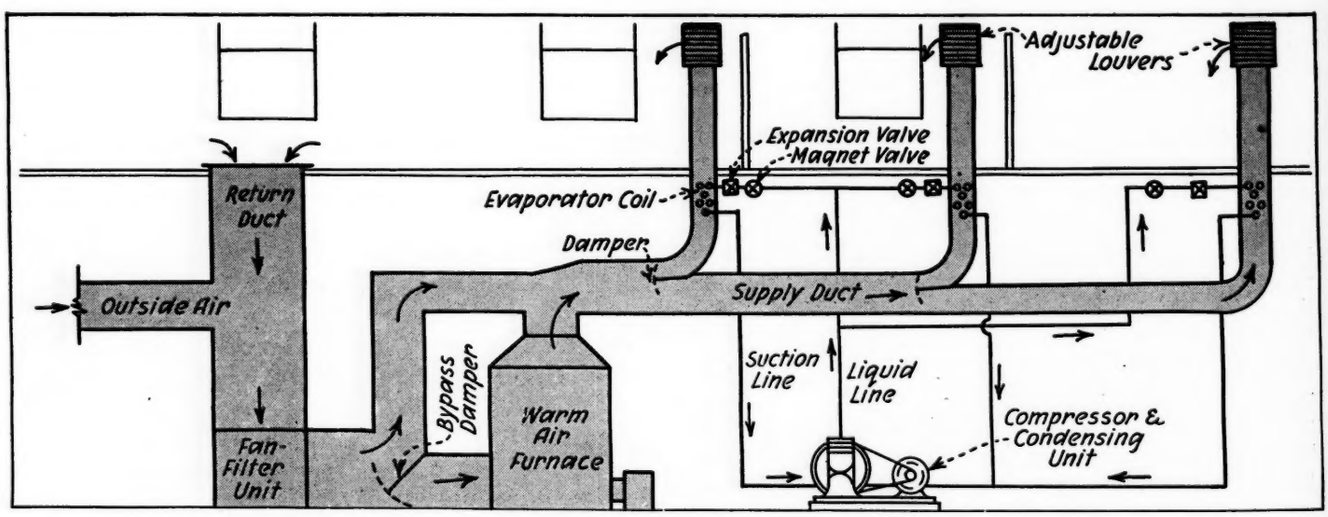


Fig. 2. INDIVIDUAL DUCT-EVAPORATOR COIL SYSTEM

Features—Supplies heating and cooling. Centrally located furnace and cooling unit. Evaporator coils located in individual ducts. *Advantages*—Smaller ducts can be used than in preceding case. Standard warm-air furnace can be used. Operation simple. Evaporator coils relatively inexpensive as compared to individual unit conditioners. *Disadvantages*—Manual dampers inconvenient. Needs large duct from evaporator coil to louver. Coils offer resistance to air in winter heating. Return ducts if connected to each room are expensive. *Options*—Use ice, well water, or steam jet for source of cooling.

ings on these pages[2] show some of these arrangements together with information as to their advantages, disadvantages, and features. The material on these pages is based on drawings and information supplied by J. F. Lamb, air conditioning engineer, Westinghouse Electric and Manufacturing Company.

[2]Hook-ups for other functions of conditioning appeared in the October, 1932, issue of HEATING AND VENTILATING.

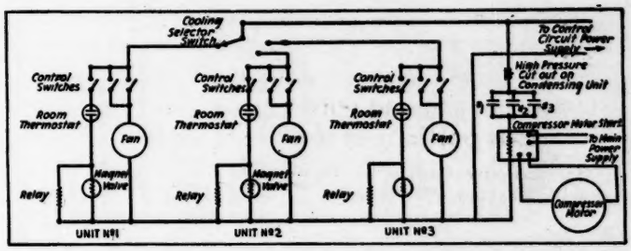


Fig. 5. Wiring diagram for installation shown in Fig. 4.

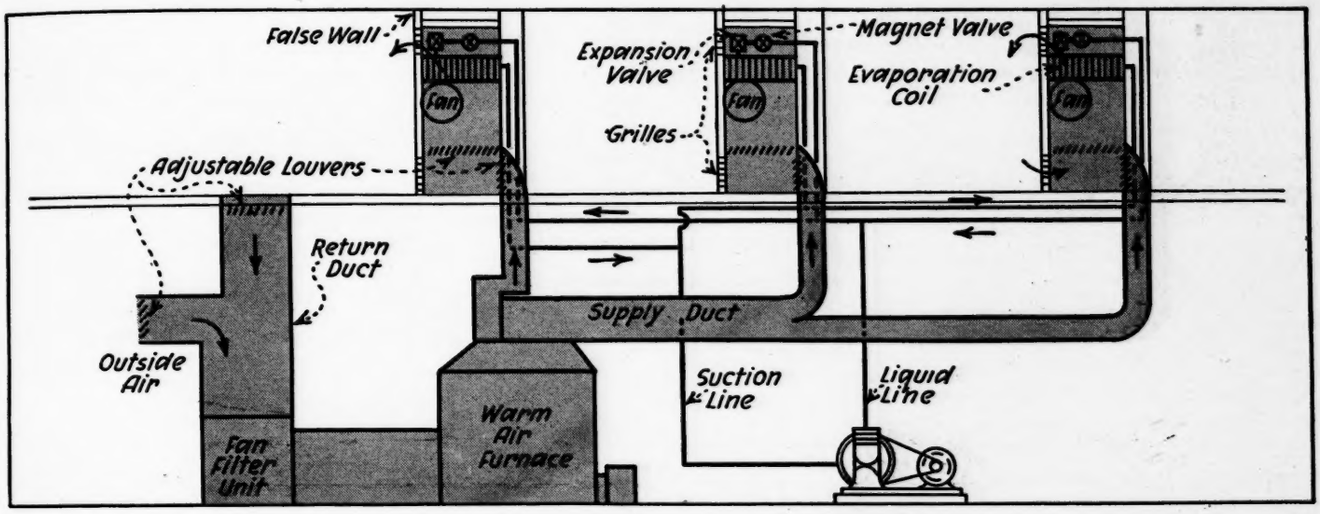


Fig. 3. BUILT-IN ROOM COOLER-WARM-AIR SYSTEM

Features—Warm-air heating with individual built-in cooling units in each room. Centrally located cooling unit. *Advantages*—Standard warm-air furnace and ducts can be used. Cost of cabinet for room unit saved. Can circulate outside air at night. *Disadvantages*—Lack of accessibility if not designed properly. Built-in units probably not practical for old houses.

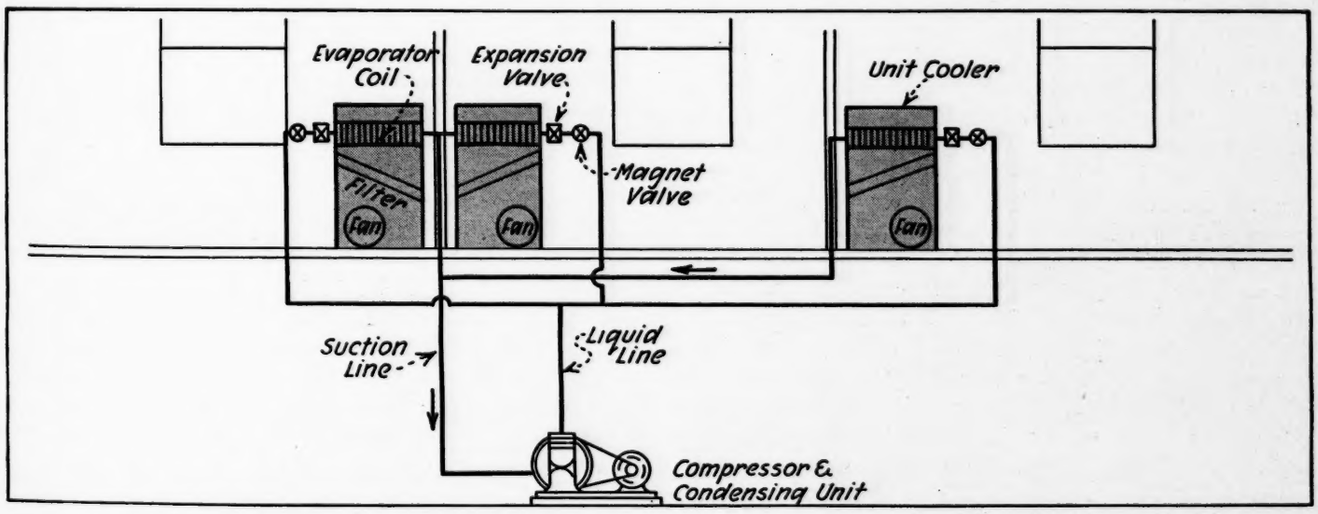


Fig. 4. UNIT COOLER SYSTEM

Features—Remotely located cooling unit with cabinet room coolers. *Advantages*—Refrigeration capacity sufficient only for one group of coolers needed. Standard equipment can be used. Suitable for modernizing jobs. *Disadvantages*—Requires large floor space. Cost of piping. Cost of units. *Options*—Self-contained cooling units instead of remotely located compressor and condenser.

EDITORIALS

Keeping Up Confidence

CONFIDENCE is to business activity what a mainspring is to a watch. With a mainspring the watch can operate as it should, without it there can be no satisfactory performance no matter how good the rest of the mechanism may be. Just as the mainspring furnishes motive power so too does confidence furnish business with a motive and an inspiration to keep going.

All this is not only simple but trite. Repetition would be foolish and pointless if it were true that the absence of confidence and its recovery could be as easily, as quickly, and as cheaply detected and replaced as can a broken mainspring. Unfortunately, this is not the case for confidence is subtle, elusive, hard to build up but easy to destroy.

Difficult as it is to get at the true facts there is a feeling abroad that confidence is on the wane. Evidence of this situation is found in the President's allusion to the subject in his Green Bay speech and in statements of cabinet members since, in discussions in the press, and in everyday conversations. Confidence is too delicate and too tremendously important, especially under present circumstances, to take any chances with it. If it is really waning it must be rebuilt at all cost and at once.

In his months in office the President has shown himself a master at keeping in touch, and in delivering timely statements when most needed. Partly because of this ability and partly because of his unprecedented control over the economic machinery, statements coming directly from him personally have an effect in creating confidence such as nothing else can possibly have. He alone knows his own ultimate program. It is to be hoped that the President will see fit promptly to take the lead by a clear-cut statement which will really reassure business.

To our mind such a statement to be really reassuring and to have the desired effect of starting private investment with its train of more jobs and attendant benefits should cover at least three major points.

First and foremost, the monetary policy should be clearly and distinctly set forth. If the idea of returning to a balanced budget in 1936 is still in effect, that purpose should be plainly restated. The prospects regarding inflation should be fully and frankly discussed. It is hard to see what is to be gained by secrecy.

Next, the matter of actual government control over business should be clarified. All of us are aware that the administration certainly aims at some measure of permanent control. What makes this state of affairs disconcerting and causes lack of confidence is not so much the fact that this is true, as that the limits are not well defined. While the public has been assured that the aim is not to extend the control to a point where owner management is impossible, still there is apprehension, and the whole plan needs restating, with some guarantees and evidences that practices are to be kept in line with the policy. Particularly must the future of NRA and the codes be included for they directly affect every transaction. A large part of the apprehension arises over the feeling of uncertainty about the code situation.

Then there is the question of the profit motive in business. The President has already indicated that legitimate profits are not to be cut off and that the status of profit as a motive for carrying on a business is not under question. "Fair" profits are to be encouraged. There is some feeling that "fair" is used in the sense in which it is applied to the railroads and to the utility companies. If this is the meaning it should be so stated. If not, then the real idea should be made clear, and the whole objective reaffirmed.

A definite statement by the President probably would do much good, could certainly do no harm, and we feel that all can join in urging him to help bolster up confidence at once.

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An Old Contributor Passes

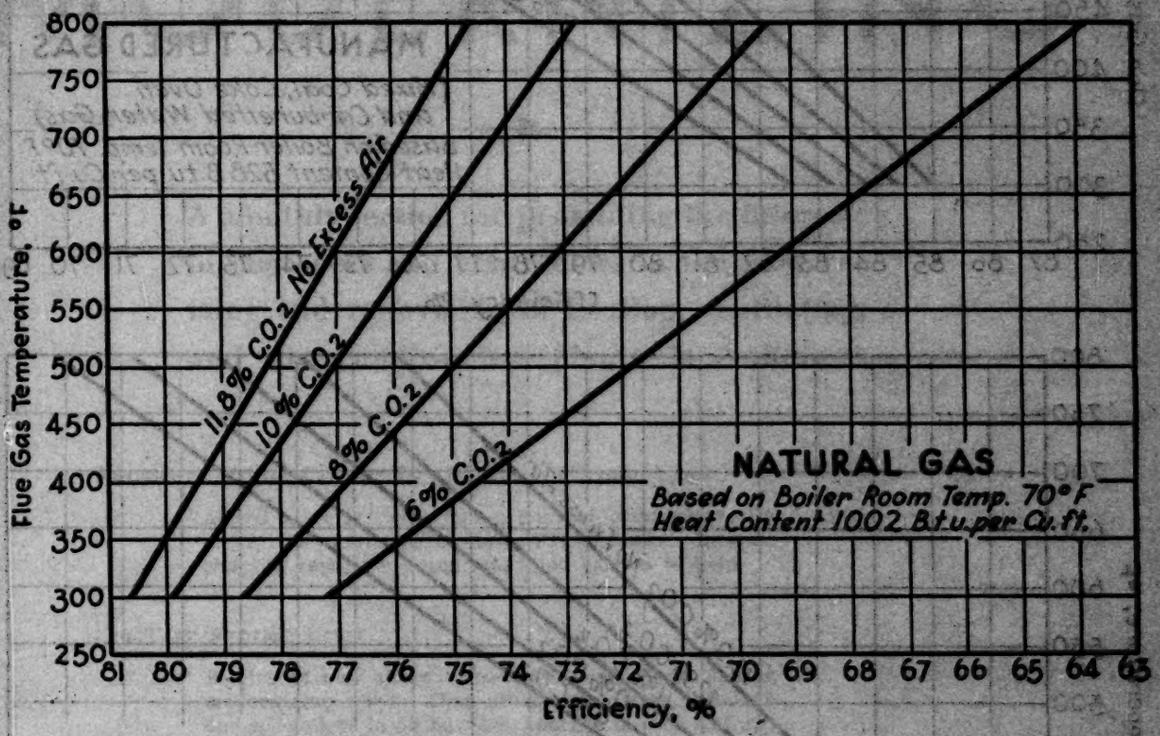
EVER since December, 1906, or for a period of nearly 28 years, HEATING AND VENTILATING has published each month a series of charts showing weather conditions in five of the principal cities. When these charts first appeared weather data were by no means as widely used as at present. Neither had such charts been worked up into useful form. Since then we have evidence that these charts have found an ever increasing usefulness to numbers of our readers.

Preparation of the charts from the forms of the Weather Bureau is a task calling for patience, knowledge, and painstaking attention to detail. From their inception this work was done by G. J. O'Connor, of the staff of the Bureau in New York. Over a long period he never failed to appear promptly with his charts ready for printing, while his accuracy and his zeal to see that they were minutely correct became a byword with the editorial staff. Now Mr. O'Connor has passed away. He leaves behind, however, a memory of a kindly gentleman whose desire to be helpful never diminished. His contributions to the pages of this magazine are without doubt of greater volume than those of any other individual. Never seeking personal publicity, his charts appeared without a by-line. Their future preparation is being undertaken by a member of our own staff who will have as an example the record of a job well and faithfully done.

COMBUSTION DATA—GAS

Type of Gas	Heat Value B.t.u. per Cu. Ft.	Cu. Ft. Air per Cu. Ft. Gas[1]	Comb. Products per Cu. Ft. Gas[2]	Max. % CO_2 in Flue Gas	Max. Flame Temp.—No Excess Air	Sq. Ft. Steam Rad. per Cu. Ft. Gas per Hr.[3]
Carb. Water Gas	524	4.51	5.24	17.1	3700	1.25
Mixed Coke Oven and C.W.G.*	545	4.71	5.51	18.9	3630	1.30
Mixed Coal, Coke Oven and C.W.G.*	528	4.53	5.32	11.8	3640	1.33
Retort Coal Gas	600	5.23	6.01	11.9	3660	1.50
Producer Gas	135	1.00	1.82	20.5	3010	0.34
Birmingham Natural*	1002	9.41	10.50	11.8	3565	2.50
Pittsburgh Natural ..	1129	10.58	11.73	12.1	3562	2.83
So. California Natural	1116	10.47	11.62	12.1	3580	2.79
Kansas City Natural.	974	9.13	10.23	11.9	3535	2.41

*Boiler Efficiency Charts Plotted For These Gases.
[1]Theoretical for complete combustion. Actual requirements are 30% higher.
[2]Include water vapor and based on 60° and 30 in. pressure.
[3]Boiler Efficiency — 60%; Steam Radiator 240 B.t.u. per sq. ft. per hr.



EXPLANATION OF BOILER EFFICIENCY CHARTS

The three boiler efficiency charts shown on these data sheets give the approximate efficiency of gas boilers using natural or manufactured gas when the temperature and carbon dioxide content of the flue gas is known. For example, assume that in a boiler using natural gas the flue gas temperature is 500° and the carbon dioxide content is 8%. Follow a horizontal line *on the natural gas chart* from the 500° point on the vertical scale to the 8% carbon dioxide line. Then drop a vertical line to the efficiency scale. The figure obtained, 75%, takes into account the heat loss due to excess air, flue gas temperature, and hydrogen combustion. It does not allow for incomplete combustion, for moisture in the gas or air, or radiation. The first two losses will seldom total more than 2% while the radiation loss depends upon the particular conditions of the installation. In a well constructed boiler it is usually low, though in poorly insulated units it may reach as high as 20%.

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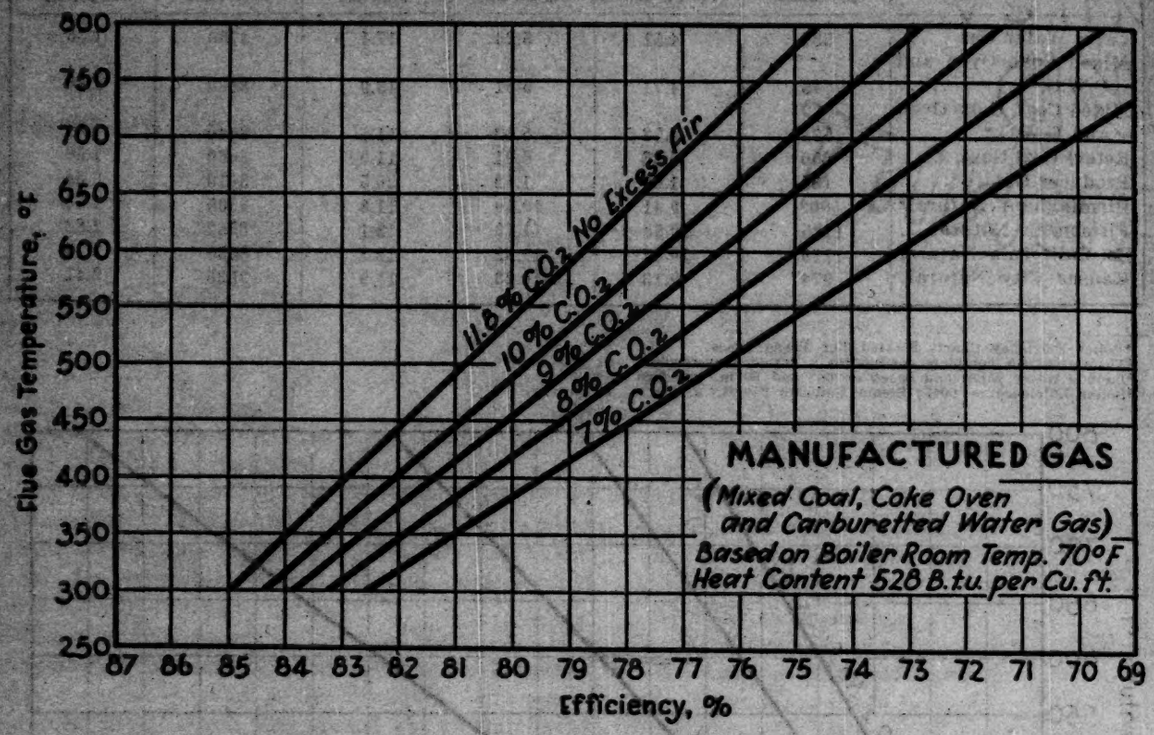
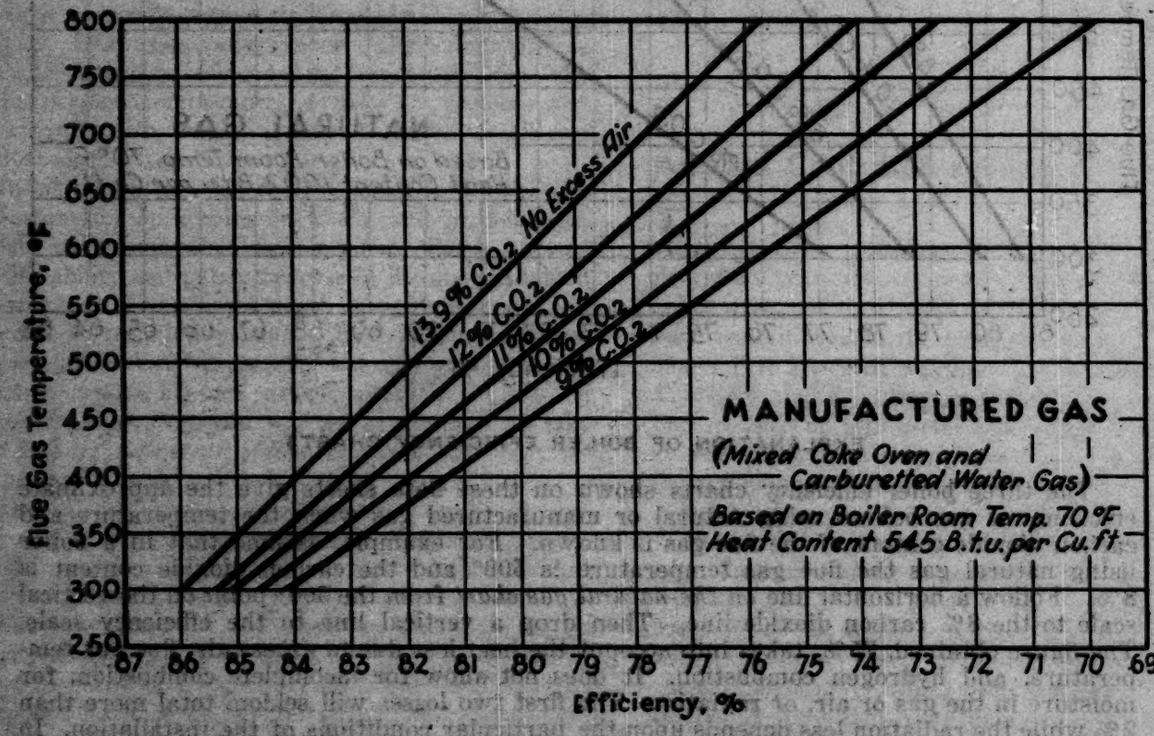
COMBUSTION DATA—GAS





Although these charts are designed for the specific gases shown, they may be used for other gases without introducing much error. For instance, assume that carburetted water gas is burned and the flue gas temperature is 500° with a carbon dioxide content of 12%. The first manufactured gas chart gives 80.9% efficiency and the second 80.8%. The actual result should be 80.5%.

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Heating and Ventilating

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MODERNIZING

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A monthly section for promoting the interests of engineers and contractors in the modernizing and renovizing of heating, ventilating, and air conditioning plants in buildings.

FEDERAL MODERNIZING PLAN GETS UNDER WAY 44

Actual start is made and a heating company really made the first loan. How FHA works, interest charges, repayment, and what you can do to help.

ON THE FIRING LINE 47

Stories of how three firms have gone about finding modernizing work. They all made surveys, although one specializes in oil burners, another in fans, and the third uses stoker installations as its main effort.

AIR CONDITIONING ESSENTIAL IN BOSTON BARS 50

Bars in Boston's leading hotels found air conditioning an attraction to customers. Illustrations suggest how it was worked into the plans. Those bars which didn't include air conditioning when they were planned are now worth investigating.

NATIONAL HOUSING ACT UNOFFICIAL ORGANIZATION CHART 52

Modernizing is but one phase of the work of the Administration. The chart makes clear how it fits into the larger program.

MODERNIZING NOTES 52

Publicity on government program obscures importance of other work; new contractor plans are appearing; preliminary estimates show good results from FHA plan; air conditioning carries modernizing appeal.

Federal Modernizing Plan Gets Under Way

Government agencies move to put plans in operation. Honor of first FHA loan goes to radiator company, while another announces credit plan with 3-year repayment

WESTERN UNION

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L H GOLDBRIGHT JR. VICE PRESIDENT-
57 WEST 39 HEATING AND PLUMBING FINANCE CORP-

CONGRATULATE YOU ON MAKING FIRST REPORT OF INSURED LOAN BY FINANCE COMPANY UNDER FEDERAL HOUSING ADMINISTRATION MODERNIZATION INSURANCE CONTRACT STOP GREATLY APPRECIATE YOUR ENTHUSIASTIC COOPERATION IN PROGRAM STOP ARE TREMENDOUSLY ENCOURAGED OVER UNIVERSAL RESPONSE THROUGHOUT THE COUNTRY ON THE PART OF FINANCIAL INSTITUTIONS

ALBERT L DEANE DEPUTY ADMINISTRATOR

THESE 41 words did more than acknowledge American Radiator's financing subsidiary's contract No. 13013 with the government.* They announced more or less formally to the heating industry that the frantic organization of effort to aid the building industry in obtaining modernizing business had at last begun to get results.

American Radiator Company employes were proud and excited that their company had arranged the first loan under the Federal Housing Administration.[1] An unnamed (by request) homeowner in Brooklyn was the recipient of the $343.58 loan. With this money the unidentified person will install a Redflash boiler, Corto radiators, and other accessories to provide steam heating in a house formerly heated with stoves. The system will be installed by the Brooklyn Radiator Corporation, heating contractors.

The beginning of actual operation of the modernizing program of FHA was front page news for every newspaper in the country. Before the first loan had been arranged, FHA plans had been sent to 28 thousand financial institutions, regional, state and district directors[2] had been appointed, and other moves made to keep the modernizing ball rolling. Objectives: Give reemployment to a large number of the million and a quarter building tradesmen and nearly three million workers in contributing industries now unemployed; provide a market for manufacturers of building materials by bringing up to date the 12 million buildings in need of repair, 3½ million of which require major improvements.

Although the news broke suddenly for the layman, the building industry knew that behind the scenes Federal Emergency Relief Administrator Harry Hopkins had started working, with others, on the FHA program when the Federal Housing Act passed Congress late last June.

The heating industry is primarily interested in FHA plans for modernizing.[3] This division, headed by Deputy Administrator Albert L. Deane, does not loan money, guarantees loans made to property owners by banks, building and loan associations, or finance companies, for modernizing to the extent of 20% of such loans. Loans can range from $100 to $2000; notes may run for any number of months from one to three years. Only security required is an adequate earning income and a good credit record.

Modernizing has long been recognized as a principal means of getting business for manufacturers, contractors, engineers and architects. Two things, however, have held up successful plans for going about modernizing in a large way. One, high interest rates on money borrowed for modernizing and, two, the inability to borrow for a longer period than one year.

The FHA plan overcomes both of these objections. The return to the lending agency dare not, under any plan under which the loan can be insured under FHA, collect more than $5 discount per year on each $100.[4]

FHA activities are not the only government activities affecting building. Others are:

Public Works Administration, which had a total appropriation of $3.8 billion, an important percentage of which was allotted to the Treasury Department for government buildings. Another slice went to the Housing Division for loans to limited dividend corporations and municipal housing authorities for slum clearance and low cost housing projects. A subdivision of Housing Division is Public Works Emergency Housing Corporation, which builds low cost housing projects itself.

*On August 24, National Radiator Corporation announced an installment credit plan, with 3-year terms without down payment, and with a free insurance feature, publicized this move to 14,000 contractors and dealers.

[1]A woman property owner in Washington, Miss Alma McCrum, is credited with being the first. Reason: Photographers, movie men, and FHA officials had arranged for the formality.

[2]Who will be part of the Better Housing Division of the National Emergency Council, which in turn is the immediate field agency of FHA. Prominent among these appointments were those of New York Regional Director Julian M. Gerard, brother of former Ambassador Gerard; Charles Edison, son of the late Thomas A. Edison, Director for Region No. 3; Edwin N. Jones of Pittsburgh, State Director for Pennsylvania, and publisher of the Construction Digest; Fred Hoke of Indianapolis, State Director for Indiana, widely known business man and manufacturer; Nels A. Pearson of Sheridan, Wyo., State Director for that state, prominent contractor and builder; District Director for Eastern Pennsylvania, Edwin Paul Simon, Philadelphia architect and business man.

[3]Although other activities such as those concerned with mutual mortgage insurance and national mortgage associations will help clear up dangerous conditions in building industry, may aid in reviving building when plans get going.

[4]A borrower wishing to do a $90 modernizing job might borrow $100 for one year. He would receive $95 and in one month (and each month thereafter) pay back $8.33.

THE NEED

Real Property Inventory disclosed that of 2,313,955 dwelling units in 1,728,521 structures in 63 cities:

- 38,188 structures unfit for use
- 273,511 structures in need of structural repairs
- 769,359 structures in need of minor repairs
- 213,653 dwelling units having no indoor running water
- 584,042 units having no bathtubs or showers
- 175,765 units found vacant
- 365,474 units crowded, overcrowded, or greatly overcrowded

Interest Costs on Short Time Loans for Modernizing (Prior to FHA Plan):

- From approximately 15% per year to 3½% per month on unpaid balances
- Actual rate paid under latter plan, 51%
- Loans for one year only

THE PLAN

Money Loaned by Banks, Finance Companies, Building & Loan Associations. FHA guarantees 20% of these loans.

Interest Rate, $5 discount per year per $100. Actual rate figures to about 10%. No other charges.

Term—1 to 3 years.

Amounts—$100 to $2,000.

Security—Only that borrower must have annual income of five times annual payments on note and a good credit record.

Red Tape—Forms greatly simplified.

Loan to be Used For—Improving residential, industrial, commercial and farm buildings, PROVIDED material bought will be an integral part of the property.

ADVANTAGES OF FHA PLAN

Interest Rates 4 to 5% lower than best possible previously obtainable

Longer periods in which to repay

No security required, very few restrictions

No down payment necessary

Forms simplified, minimum of red tape

No legal, filing, or other fees.

THE ORGANIZATION

Headed by FHA Administrator James C. Moffett. Deputy Administrator Albert L. Deane heads the Repair and Modernizing Section. (Other deputies will handle mortgage problems.) Under Deane are regional directors, state directors, local committees.

RESULTS

FHA expects to loan half a billion before New Year, a billion additional in 1935. Reemployment for many of 1¼ million out-of-work building tradesmen.

Millions of dollars worth of equipment sold by manufacturers of building supplies, more millions in jobs for contractors.

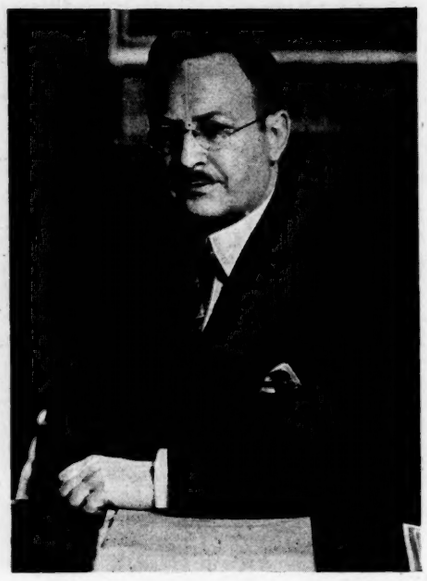
WHAT YOU CAN DO

The Government will have no paid publicity. Every member of the industry must help by talking up FHA plans. First thing to do: Modernize your own home; second, if your bank is not cooperating, find out why; third, see that your newspaper is giving publicity to FHA releases.

Manufacturers: Fully acquaint your salesmen with the plan so that they can in turn sell the idea to contractors and dealers.

Contractors: Inform every man in your organizations; help them sell your prospects.

Federal Home Loan Bank Board, which has four subdivisions: (1) Home Owners Loan Corporation which refinances distressed home mortgages and lends money for modernizing directly to owners of refinanced homes for modernizing.[5] HOLC can issue bonds up to $3 billion; (2) Federal Home Loan Bank system, whose membership consists of building and loan associations, savings banks, life insurance companies. It discounts home mortgages; (3) Federal Savings and Loan Associations. Permits and encourages establishment of federal savings and loan associations in communities where home loan financing is not constantly available; (4) Federal Savings and Loan Insurance Corporation, established under the National Housing Act. Issues up to $5000 of investments of shareholders in building and loan associations.



L. H. Goldbright, Jr., vice-president and treasurer, Heating & Plumbing Finance Corp., which made first loan under FHA provisions

Reconstruction Finance Corporation, source of credit to building and loan associations, banks, insurance companies, to ease mortgage tightness and can loan money to industrial and commercial firms for property improvements under certain restrictions.

Federal Loan Banks. Act the same as HOLC except that they are confined primarily to farm refinance. Will lend money for modernizing farm buildings.

Subsistence Homesteads. Under the Department of Interior, finances and builds model home rural communities for homesteaders.

Critics of the Administration disparage the claims for low interest rates, point out that the government will loan no money, that banks must make the loans. The plan had hardly gotten under way August 15 until FHA claimed that cooperation had been obtained from Wall Street banks. A *Daily News* (New York's leading tabloid) reporter that day visited large New York banks, found that only two had set up any machinery for home loan, found none willing to make loans for longer than one year. Banks defense: it was too soon to expect them to be prepared. By August 21 the American Bankers Association, through its President Law, assured President Roosevelt of hearty cooperation. At that time 2889 acceptances of contracts of insurance had been made.

Meantime FHA's Department of Public Relations had been extremely busy. Dozens of press releases had been issued and elaborate pamphlets[6] distributed.

[5]And by August 18 had made 447,848 loans totaling $1 1/3 billion.

[6]Among these are: "Modernization Credit Plan, Bulletin No. 1," containing specific and detailed information for banks, finance companies, and others (Bulletin No. 2 is designed for building and loan associations and insurance companies who are required to loan against mortgage security); "How Owners of Homes and Business Property Can Secure the Benefit of the National Housing Act," containing questions and answers for the benefit of borrowers and practical suggestions for modernizing homes; "Community Campaign—How Your City Can Get the Greatest Benefit from the NHA," a 24-page bulletin for organizing and operating local modernizing campaigns; and others.

(Left) Roger D. Steffan, director, Modernizing and Credits Division, FHA. (Center) Albert L. Deane, deputy administrator, FHA, in charge of Repair and Remodeling. On leave of absence from duties as president of General Motors Holding Corp. (Right) Ward M. Canaday, Director of Public Relations, FHA, formerly advertising manager for Willys-Overland, on furlough from presidency of U. S. Advertising Corp. Photos by Harris-Ewing. An unofficial organization chart of FHA appears on page 52.

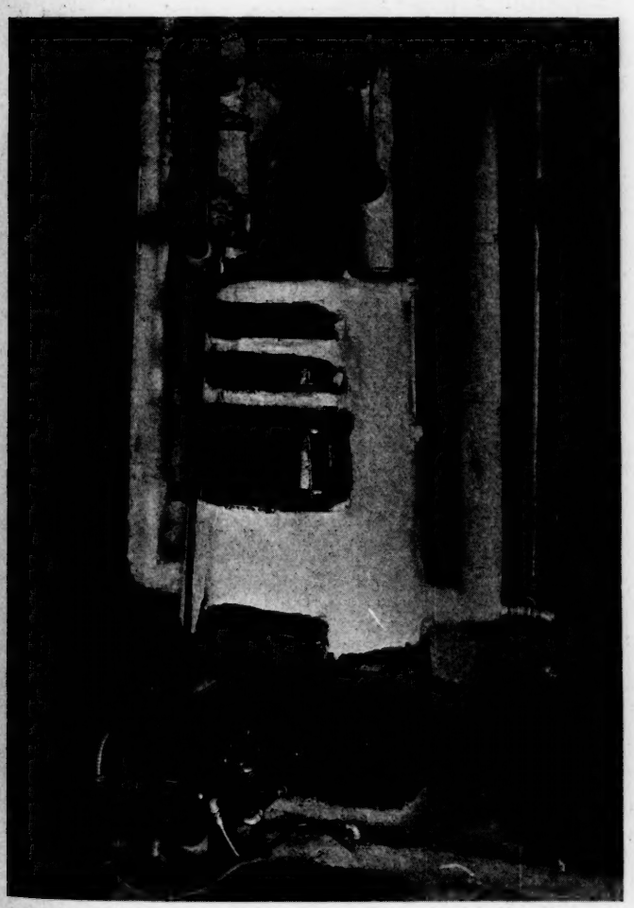
ON THE FIRING LINE

Practical, usable, and result-getting methods and experiences in getting business

Oil Burner Jobs Build up Modernizing

This Story deals with a heating and ventilating contractor who did not wait for the depression. He has been in business over 25 years and in the past eight years has done $250,000 worth of modernizing because of his interest in making oil burner installations. During that period he has installed some 2000 burners and in 1500 instances has also secured some modernization work as a direct result.

How It's Done—As in most cases the means have had to be fitted to the end. Since finding oil burner jobs requires a definite hunt, a force of five outside men not only looks for suitable jobs but does outside selling. These men are not expected to do all the searching though, for local advertising and cash rewards to customers are also used. Satisfied users are also a source of much business. No class of building is considered out of order as a possible source of work. Neither are the outside men restricted as to territory. Both owners and tenants are solicited for the latter are found to exert a powerful influence on owners because of threats to move.



Oil burner installations furnish excellent leads to other modernizing work

A regular force of heating engineers is employed. When a possible job is located one of the first things is to have one of the engineers visit the property and make a thorough survey of the whole existing plant. The data collected are analyzed to form the basis for a proposal which is carefully drawn up, personally addressed, and presented by hand in neat blue backers. These data also form the basis for estimating that in seven out of ten of the jobs surveyed there is something wrong. In many cases this situation is thought to be a direct result of the widespread practice of skimping the heating plant as done by speculative builders. Boilers, piping, and radiators are found too small. In fact it seems that they are usually calculated for a 40° temperature difference—a difference entirely too small for the locality. This is what has permitted the large amount of incidental modernizing work.

Another unusual feature is that the organization includes a man who specializes in making layouts for modernized basements. In residence jobs he plans playrooms, tap-rooms, pool-rooms, and suitable ones for commercial basements. Offering this service is in many cases a decisive factor.

Service is also a part of the plan and is offered on either a monthly or annual basis. So also is commercial financing although in the experience of this contractor it is not needed after the buyer once finds he can get it.

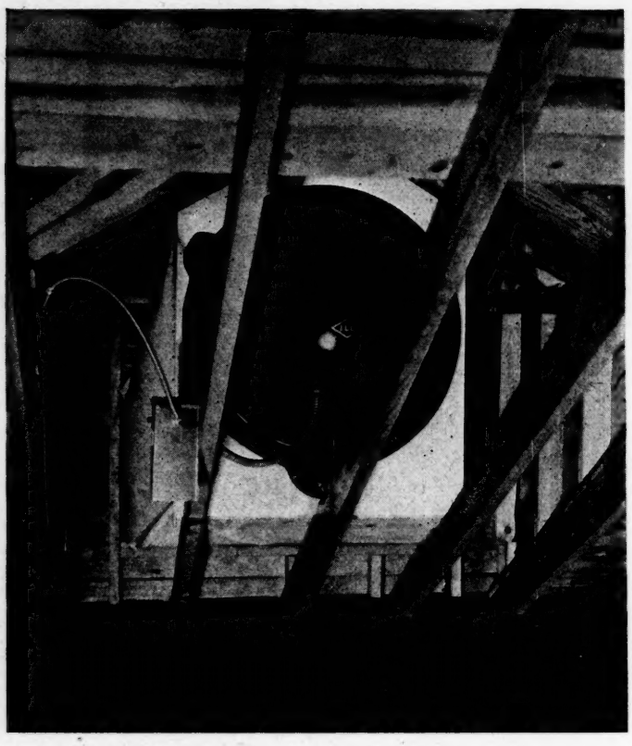
Firm—Lawrence J. Bennett, Inc., Hempstead, N. Y.

Modernizing with Ventilation

Interest in Ventilation—An unexpected result of the publicity given to air conditioning and air cooling in recent years is the improved understanding of how effective untreated outside air is in accomplishing a limited amount of cooling. Building owners looking for ways of keeping tenants satisfied can now be readily interested. Here is the way one organization has found modernizing business because of this situation.

Apartment Houses—Top floors of these houses are notoriously hard to rent. Tenants know they are hot in summer, for the heat passes readily through the "clearway" above the ceiling under the roof. In many cases, the depth of clearway space is about 24 in. and circulation of enough air through it to change the volume once every 10 or 15 min. will accomplish cooling at an attractive cost. In some recent cases, this kind of ventilation has definitely resulted in renting top floor apartments that otherwise could not be rented.

A method found to work to advantage is to install an exhaust fan in a small penthouse on the roof and to



Attic fans furnish many modernizing opportunities

provide other penthouse structures, with louvers, to admit air. The accompanying illustration shows the methods. In placing fans, the discharge is faced to leeward to prevent back drafts.

Some elite apartment buildings recently have purchased electric exhaust fans for roof installation, placing such fans directly above interior air shafts and stairways. If skylights are in use it is necessary only to remove glass and connect to the fan inlets. Otherwise, it may be necessary to cut apertures in roofs to connect to fan inlets.

Roof fans and attic ventilation are not the only modernizing opportunities which a resourceful man can think of in apartment houses, though. When there are restaurants or kitchens in the house, they can often be interested in exhaust fans.

Boiler rooms and basement stores located in apartment houses are also likely places. Both supply and exhaust fans are useful in summer in creating circulation to cool and prevent moulding. In boiler rooms, supply fans are useful throughout the year, for they assist the boiler draft.

Residences—Attic ventilation of single residences, especially those in the class costing over $10,000, offers a field wherein this organization has not only found substantial modernizing already, but where the prospects for the future look especially promising. To some members of this organization it appears that the use of attic ventilation in this kind of building just now offers a much more attractive field than does mechanical cooling with refrigeration.

A recent installation of this kind is typical. A 24-in. propeller type fan was placed in an attic dormer. The procedure is to close upper floor windows late in the afternoon or early in the evening, and open windows on the ground floor. The attic fan then creates circulation in the ground floor rooms. Later in the evening, the upper floor windows are opened and rooms in this floor are cooled before time to use them. Attic temperatures have been lowered as much as 30° and first and second floor rooms have been cooled 10° to 15°.

Residences also offer a place where fans for window mounting can be used to advantage, with kitchens as the most usual location.

Organization—Information based on experience of A. F. Hinrichsen, Inc., New York.

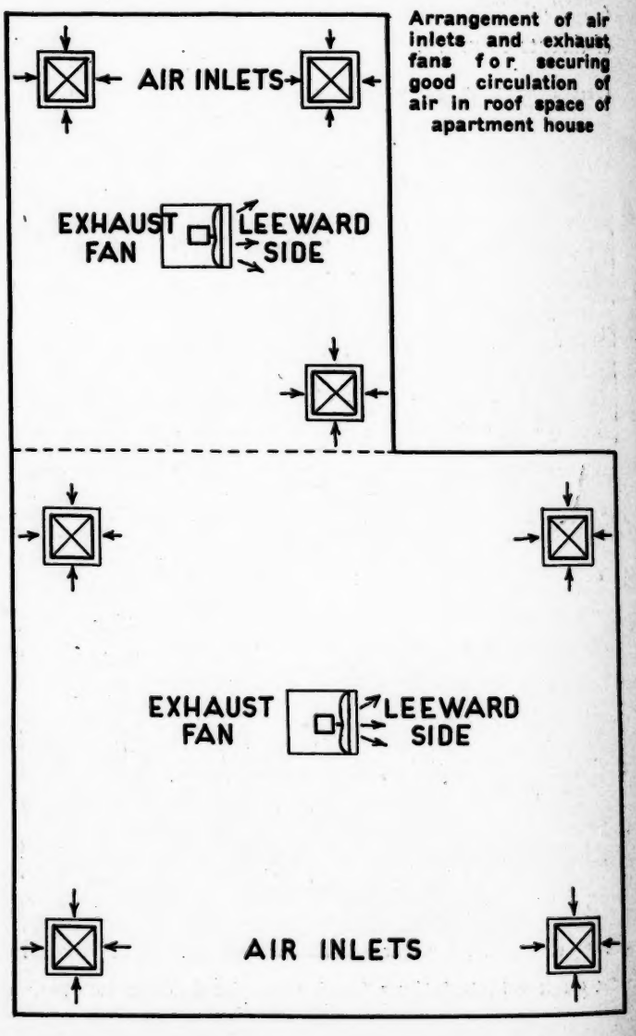
●

Modernizing from Stoker Estimates

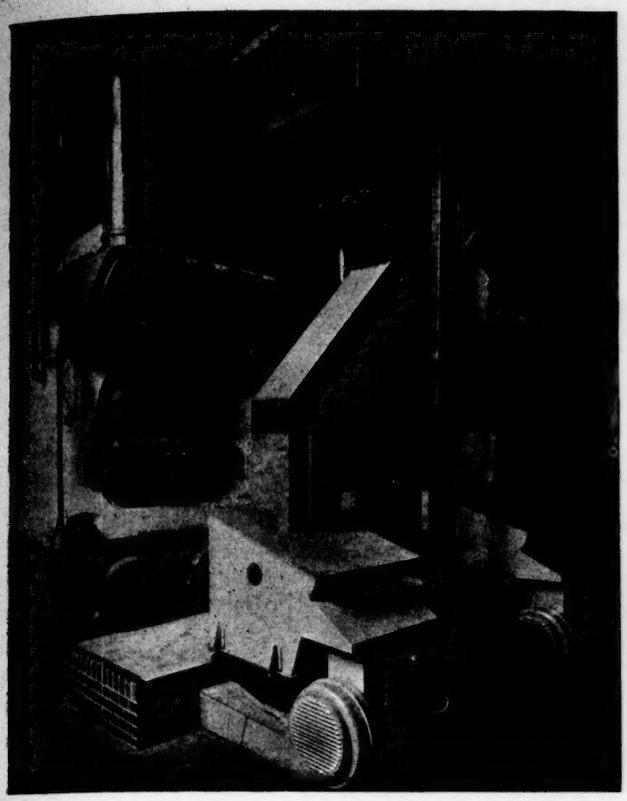
Situation—When new construction fell off, an established engineering and contracting firm which had been specializing in a well-known line of heating apparatus decided to add stokers.

Result—With stoker estimates has come other modernizing work found necessary during the course of actual surveys, and has resulted in keeping up income and volume without serious interruption through the past several years.

Methods—Pushing stokers meant getting actual estimates, for it was soon found that generalizations would



Arrangement of air inlets and exhaust fans for securing good circulation of air in roof space of apartment house



Two stoker-fired boilers for heating six buildings on large estate. Automatic feed from outside bunker supplies stokers with coal.

No._____ _____, 193____

NAME _____

ADDRESS _____
(Street) (City) (State)

Kind of Building_____ Construction_____ No. Floors_____

Length_____ Width_____ No. Rooms_____ Contents_____ Cu. Ft.

Sq. Ft. Exposed Wall_____ Sq. Ft. Exposed Glass_____

Greenhouse _____ Sq. Ft. Glass_____

BAKERY: Type Oven_____ Make_____

Be sure to give details of construction, kind and amount of fuel used and make sketch of oven on back of this sheet.

HEATING SYSTEM

Warm Air, Hot Water, Steam or Vapor-Vacuum_____ Steam Pressure_____

Direct Radiation_____ Sq. Ft. Indirect Radiation_____ Sq. Ft.

Make of Boiler or Furnace_____ No. and Type_____

Fire Box: Length_____ Width_____ Height_____

Electric Current: A. C. or D. C._____ Volts_____ Cycle_____ Phase_____

FUEL

Fuel Now Used:	Average Amount Burned Previous Seasons:
Coal _____	Tons _____ @ $_____ Per Ton
Oil _____	Gals. _____ @ $_____ Per Gal.
Gas _____	Cu. Ft. _____ @ $_____ Per M.
Coke _____	Tons _____ @ $_____ Per Ton
Central Heat_____	Average Cost in Previous Years $_____

Stoker Required_____ Front or Side Installation_____ Level or Pit_____ Depth of Pit_____

Coal recommended: Slack, Nut & Slack, washed and air dried _____

B. T. U._____ per lb.; _____ % Ash; _____ % Sulphur; _____ ° Clinkering Point

Price Quoted for Job Installed $_____

Dealer _____

Salesman _____

Preliminary survey sheet for heating systems

not work. Casting a roving eye over a job and offering a number of remedies did not impress the owner. This led to making actual detailed surveys right in the boiler room and offering specific written proposals. The visit to the boiler room also offered the opportunity to observe where changes are necessary and at the same time get enough data to work out modernizing proposals. As the first recommendation usually includes other modernizing necessary to get the full benefit of installing stokers, it is found that such remodeling is often undertaken even when the stokers themselves are not put in. Thus, the stoker survey often leads to other work. Fully 50% of the jobs surveyed show some faults in the system and this agrees with the findings of others.

As an instance of what unexpected developments are found, six buildings on a private estate were heated by six separate oil-burning boilers. The owner was not satisfied with his fuel costs, although the heating results were satisfactory. He authorized zoning the piping to these buildings and placing an automatic motorized control in each line with two stokers under two of the existing boilers to supply heat to all six of the buildings. This arrangement, while costing a considerable sum, has resulted in a substantial fuel saving and has left the owner happy.

NAME OF BUILDING	YEARS	INSULATION	WELDED	TYPE OF TRAP	STEAM	CAPACITY IN LBS. OF STEAM PER HOUR	NUMBER OF BOILERS	MECHANICAL	OVERFIRED	NUMBER OF STOKERS	MAKE OF STOKER	BOILER OR FURNACE	TONS OF COAL	TOTAL COST	COST PER HOUR	COST PER TON		
WEST BABYLON SCHOOL	1930-31	YES	STEEL	VAPOR	YES	15,400#	12	YES	YES	336	HAND	A	150	9.50	1425.00	4.20	9.2¢	
" " "	1931-32	"	"	"	"		"	"	"	"	STOKER	B	80	6.50	520.00	1.55	3.4¢	
GLEN HEAD SCHOOL	1930-31	NO	C.I.	VAPOR	NO	11,800#	11	YES	YES	322	HAND	A	150	6.85	1027.50	3.15	8.7¢	
" " "	1931-32	"	"	"	"		"	"	"	"	STOKER	B	96	6.15	590.40	1.80	5.0¢	
COPIAGUE SCHOOL	1930-31	NO	C.I.	VAPOR	NO	7,000#	7	YES	NO	340	HAND	A	140	7.80	1090.15	3.20	15.5¢	
" "	1931-32	YES	STEEL	"	"	13,000#	15	"	"	360	STOKER	B	136	6.25	850.00	2.35	6.5¢	

A performance record sheet which sells stokers

This job, boiler room view of which is shown on page 49, has several unusual features. One is the chain-driven coal elevator seen at the extreme right. This has its origin in the bottom of an exterior coal bunker. It delivers to the top of the single stoker hopper shown. From the hopper are two feed chutes, each delivering coal to a single stoker. Through an ingenious tripping device placed in the hopper, when the coal in the hopper has been exhausted the trip starts the electric motor that drives the elevator belt and the hopper is filled. When full the motor similarly is stopped and feeding from the bunker stops.

In another case, two school buildings were supplied with steam from individual boilers. One building had a one-pipe system while the other used vapor. The one-pipe system was changed over to vapor, the mains were connected together, and a stoker was installed under the larger boiler. With this arrangement, the one boiler supplies steam to both buildings with a saving in fuel gratifying to the owners.

Systematic record-keeping on fuel consumption has helped promote stoker installations. Nothing impresses an owner more than a specific statement and proposal backed up by performance records from similar jobs. Particularly has this been true of school officials who are now especially interested in keeping their operating costs down. Whenever a stoker has been in one year, data on cost with hand-firing and with stoker-firing are set up side by side on the basis of cost per pupil or per square foot. Estimating on a cost per pupil basis is found less accurate than on a per square foot basis, since attendance varies while area does not. An idea of the wide range in cost is shown by the fact in some schools the seasonal fuel cost per square foot has been found to be as high as 42c with hand-firing and as low as 5c with stoker firing. Keeping records permits reducing costs to a unit basis and permits quoting accurate, checkable figures. It is believed that the follow-up and record-keeping are well worth while.

To supplement these records, and as a means of reaching school work, questionnaires are sent out at the end of each school year, asking for fuel quantity and cost data. The resulting figures can be used to set up a story in cases where the fuel costs are shown to be unreasonably high, or to be rising.

Firm: Nassau Engineering Co., Glen Cove, N. Y.

Air Conditioning Essential in Boston Bars

BOSTON hotels have found that patrons of their bars demand air conditioning. Patronage has in all cases greatly increased when cooling apparatus was installed. Managers of the hotels have quickly recognized this fact and all of the better bars are now conditioned.

One of the most famous of the combined bars and dining places is the Hotel Copley-Plaza's "Merry-Go-Round." This room has a large rotating platform in the center from which drinks are dispensed.

A 20-ton air conditioning unit provides 10,000 c.f.m. of cool air, changing the air in the room every 4 min. Outside air is drawn in at the street level and passes through ducts to the air conditioning apparatus which is located in the basement. The air is then introduced to the room by means of six inlets. All of the power for cooling and the steam for heating is obtained from the hotel's own power plant.

The English Hunt Room of the Hotel Victoria has been so heavily patronized since the installation of the air conditioning equipment that it is often necessary to place extra tables in the aisles. Patronage has jumped to 400 persons daily.

This bar, or, what is more correct, taproom, has a capacity of 136 persons and is cooled by ice. Outside air is drawn through an inlet about 25 ft. above the street level and carried by ducts to the spray chamber of the air conditioning apparatus. The cold water for the chamber is obtained from an ice bunker which holds 4½ tons. The bunker is insulated with a 4-in. layer of cork and lined on the inside with galvanized steel and on the outside with plaster. There are 12 nozzles to spray the warm return water over the ice. Approximately 3 tons of ice are used in the 14 hr. of daily operation.

The Hotel Bradford has made two exceedingly comfortable and profitable rooms out of a former cafeteria by means of remodeling and air conditioning. One is the Grill Room and the other the Cocktail Bar, both in the basement of the hotel.

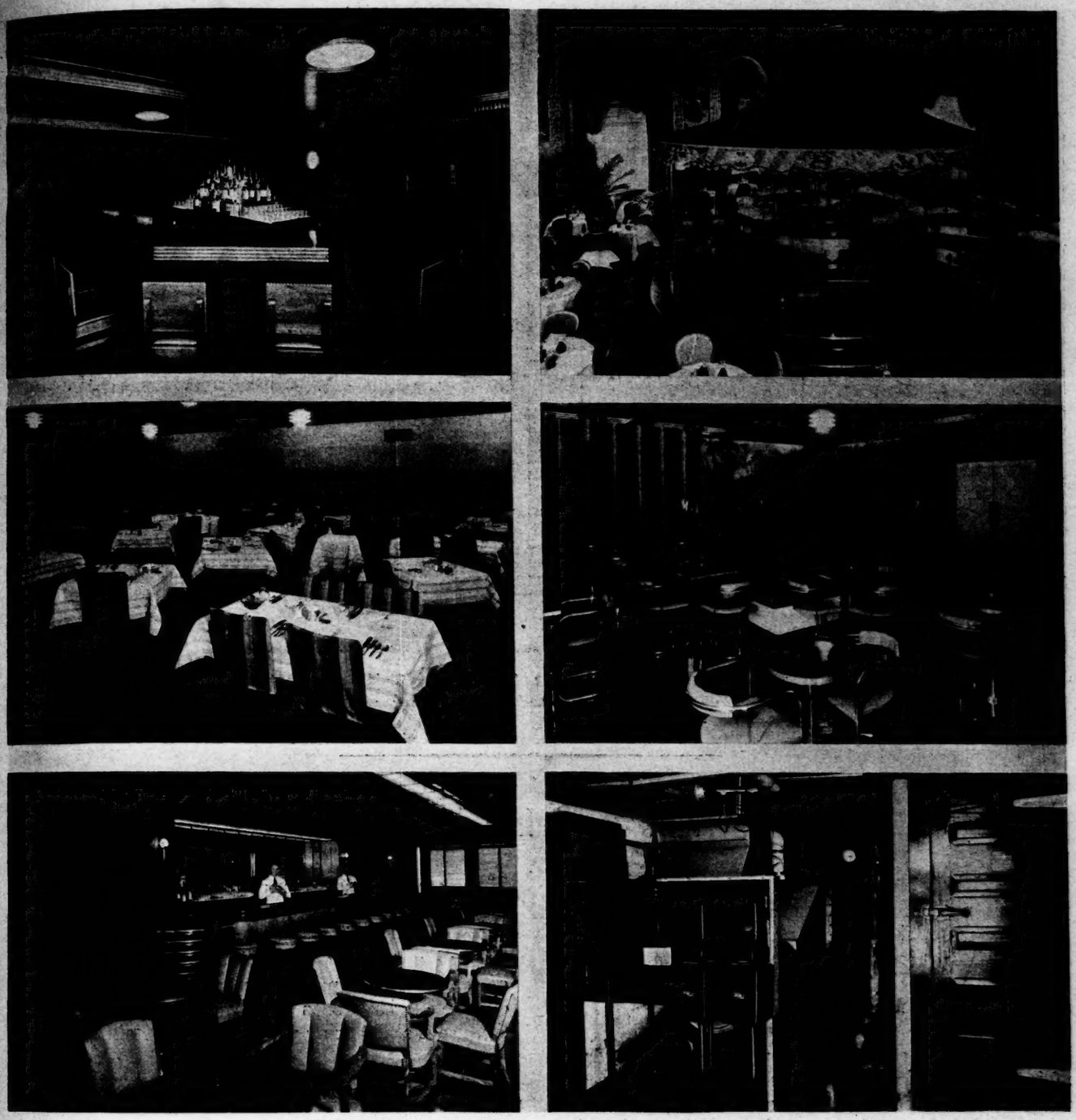
Two 3-hp. compressors are used in the conditioning apparatus for the Cocktail Bar and three 4-hp. compressors for the Grill Room. The Bar, which is of modern design, has a volume of 16,100 cu. ft., and the Grill Room, 29,750 cu. ft. Five and a half air changes per hour are made in the Grill Room and eight and one half in the Bar.

The Barroom of the Parker House, which is extremely striking, has a bar of rosewood and walls decorated with a veneer of the same wood. It has a capacity of 50 people and is cooled by a 3-ton air conditioning unit.

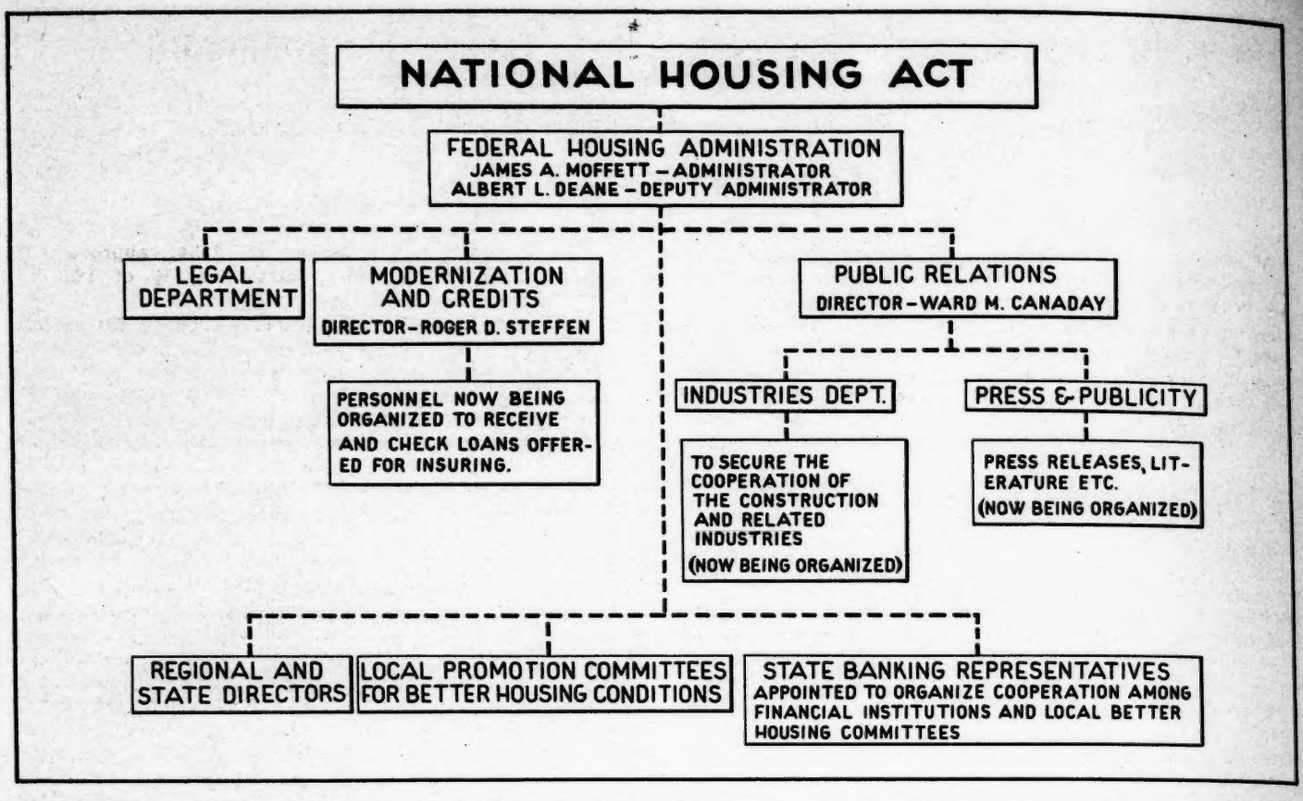
There are two other air conditioned rooms in the Parker House, the Hawthorne Room and the manager's private office. The Hawthorne Room is cooled by one 6-ton unit cooler and three 1-ton cabinet coolers, all connected to a 10-ton refrigerating machine in the basement. The manager's office is conditioned by a ½-ton spot cooler.

One of the most handsome lounge bars in New England is found in the Hotel Statler. The walls are sheathed in sleek flush panels of East India satinwood which support a barrelled ceiling of the same wood. A trough-like lighting device with a panel of opal glass is set in the ceiling and runs the length of the room.

The air conditioning apparatus consists of a 7½-ton refrigerating unit, the capacity of which can be increased to 10 tons by increasing the motor size to 10 hp. The cool air from the air conditioning apparatus is introduced into the room through the light trough in the ceiling. Approximately 8 changes of air are made every hour.



(Upper left) Patrons of the Parker House Rosewood Bar are cooled by 7000 c.f.m. of conditioned air from 3-ton unit. Bar and walls are finished in rosewood. (Upper right) Hotel Copley-Plaza's new air conditioned dining room "Merry-Go-Round." Platform and bar revolve every 8 min. (Center left) Grill in basement of Hotel Bradford cooled by three air conditioning units each having a 4-hp. compressor. (Center right) Cool and comfortable Cocktail Room of Hotel Bradford. Air Conditioning unit has two 3-hp. compressors. (Lower left) Lounge bar in Hotel Statler, cooled by 7½-ton air conditioning unit. Light trough in ceiling supplies cool air, light, and music. (Lower right) Ice cooling system which has increased patronage of Hotel Victoria's English Hunt Room to 400 persons daily. Bunker has capacity of 4½ tons of ice.


NATIONAL HOUSING ACT
FEDERAL HOUSING ADMINISTRATION
JAMES A. MOFFETT – ADMINISTRATOR
ALBERT L. DEANE – DEPUTY ADMINISTRATOR
LEGAL DEPARTMENT
MODERNIZATION AND CREDITS
DIRECTOR – ROGER D. STEFFEN
PERSONNEL NOW BEING ORGANIZED TO RECEIVE AND CHECK LOANS OFFERED FOR INSURING.
PUBLIC RELATIONS
DIRECTOR – WARD M. CANADAY
INDUSTRIES DEPT.
TO SECURE THE COOPERATION OF THE CONSTRUCTION AND RELATED INDUSTRIES (NOW BEING ORGANIZED)
PRESS & PUBLICITY
PRESS RELEASES, LITERATURE ETC. (NOW BEING ORGANIZED)
REGIONAL AND STATE DIRECTORS
LOCAL PROMOTION COMMITTEES FOR BETTER HOUSING CONDITIONS
STATE BANKING REPRESENTATIVES
APPOINTED TO ORGANIZE COOPERATION AMONG FINANCIAL INSTITUTIONS AND LOCAL BETTER HOUSING COMMITTEES

An unofficial organization chart of FHA as it appears to an outsider. No official organization chart has as yet been approved, but this one is believed to be roughly correct as far as it goes.

Modernizing Notes

NOTHING has been heard lately of the tentative proposals put out by NRA officials to test sentiment regarding material and labor price reductions as an aid in encouraging modernizing work. This can be taken as meaning that the project is at least shelved—possibly it is tabled for good.

So much emphasis has been placed on the government program for modernizing that it has overshadowed other phases of the modernizing picture in recent weeks. Latest figures available indicate that the dollar volume of modernizing in residences is about one-fourth of the total for the year. In other words, three-fourths of the dollar volume is done in buildings other than residences. It is very easy to get a wrong impression of relative values. Modernizing work isn't confined to residences or to housing, nor is all of it financed under the FHA—not by a good deal. Don't be misled, but on the other hand don't overlook the possibilities for this kind of work in residences.

Since the announcement of the details of the FHA plans several manufacturers of heating equipment have already brought out plans for financing their products through loans of this character. Means have been found for relieving contractors of the necessity of endorsing notes while the holdback on payments, so often included in earlier plans, has also been done away with. These are the first direct results of the easier financing under the government plan. The essence of the government scheme is that the contractor will supply selling and publicity effort. With the attractive features of these deferred payment plans the objections to the older plans have been largely removed. Every one of these special financing plans is worth detailed attention.

Estimates of results from the FHA are not yet obtainable from Washington. There is considerable delay between the time a loan is granted and a record is made at Washington. Evidence of the volume of modernizing work is reported by American Radiator, however. That company received 700 applications in the first four days after its new financing plan was announced.

Unless all signs fail in the closing months of the year, air conditioning is going to make a surprising showing in dollar volume. This is the first year that conditions have provided a suitable situation to let air conditioning get into the modernizing picture. There has been no doubt of its appeal for some time, but both cost and commercial difficulties have operated to hold it back to much greater extent than recently. Much of it has included cooling this year although summer cooling for residences is still making little headway in sales. Stores, restaurants, offices, bars, and similar commercial locations are, as expected, furnishing the business.

Who Contributes to Code Expenses

is question raised as Code Authorities ask for exemption from NRA ruling, X-36

X-36 is not a submarine, bomber, or the mysterious number of a foreign spy. What it is is not so dangerous to national peace but exceedingly irritating to a host of Code Authorities trying to collect money to administer their Code.

X-36 is an NRA Administrative Order, dated May 26, which exempts members of an industry from paying their share of code administration if their business under that code is not their principal line of business.[1]

Hypothetical case: Under this ruling General Electric would support the Electrical Manufacturing Industry code, need not contribute to expenses of administering oil burner, unit air conditioner, or such codes.

One result of this order is that Deputy Administrator Neal W. Foster is a busy NRA employe this month. Depending on his decision,[2] certain industries may be exempted from Order X-36. The busy Mr. Foster will give due consideration to requests that exemption from this order be granted to the warm-air furnace, unit heater and ventilator, and fan and blower industries.[3]

Principal, but not the only, point awaiting action in Washington during August was that on X-36. There are others:

Oil Burner Industry[4]—Wants modifications of its code, new election of Code Authority, reduced levies, approval of budget, exemption from X-36.

Steam Heating Equipment Industry[5]—Modification that "In the event the non-members of the Association fail to elect the member at large, the Code Authority shall consist of the members of the Board of Directors of the Association, until such time as the non-members shall elect a member at large . . . "

Fan and Blower Industry—Asks approval of budget, $12,500 for period February 14, 1934 to December 31, 1934; approval of basis of contribution of members (¼ of 1% of gross sales), and exemption from X-36.[6]

Warm-Air Furnace Manufacturing Industry—Were granted, July 27, partial[7] exemption from X-36; ask that willful price cutting be classed as an unfair trade practice; ask that the Administrator declare an emergency if and when small enterprises, wages or labor or monopoly conditions arise to defeat purposes of NIRA, and that, having declared an emergency, he can set minimum prices for a stated period.

Warm-Air Furnace Pipe and Fitting Manufacturing Industry—Filed application for amendment, a Code Authority budget and basis of contribution, and application for exemption from X-36. Amendment authorizes Authority to incur obligations, submit a budget, and make expenditures therefrom. Members to contribute to support Budget submitted in amount of $20 thousand for period June 1, 1934 to May 31, 1935. Assessments, if exemption granted, estimated at ¾ of 1% of dollar sales. If not granted, estimated at 1½% of dollar sales.

Unit Heater and Unit Ventilator Manufacturing Industries—Ask exemption from X 36; approval of budget, $11,250, for period from March 1, 1934 to December 31, 1934; approval of basis of contribution, ½ of 1% on gross sales.

Unitary[8] *Air Conditioning Equipment Industry*—Code hearing held August 1, Code returned to sponsors, and now expected to return to NRA early in September. At the hearing there was considerable discussion of the necessity of including any price regulation provisions. In view of the youth of the industry it seems doubtful if any such provisions will prove advisable now. This industry is a proposed subdivision of the fan and blower industry.

Formal announcement of the organization of the Unit Air Conditioner Manufacturers' Association, which sponsored the Unitary Air Conditioning Code, was made August 23. Temporary secretary is J. A. Dewhurst, 330 West 42nd St., New York. P. A. McKittrick, treasurer and general manager of Parks-Cramer, is president; Allston Sargent, Campbell Metal Window executive, is vice-president, and H. C. Grubbs, sales manager of the De La Vergne Engine Company is treasurer.

Refrigerating Machinery Industry—Code Authority approved by NRA August 4. S. B. McNaught of York, Pa., is chairman, William B. Henderson is secretary-treasurer. Headquarters are in Southern Building, Washington, D. C. Members of Authority are: A. H. Baer, executive vice-president, Carbondale Machine Company; D. Norris Benedict, vice-president and general manager, Frick Company, Inc.; J. M. Fernald, general manager, Baker Ice Machine Company, Inc.; G. A. Heuser, secretary and treasurer, Henry Vogt Machine Company; J. I. Lyle, president, Carrier Corporation; F. M. Roessing, Roessing Manufacturing Company; W. S. Shipley, president, York Ice Machinery Corporation, and Emil Vilter, president, The Vilter Manufacturing Co.

Air Filter Industry—As we go to press, election of Code Authority is expected momentarily. This code went into effect August 1.

Heating, Piping and Air Conditioning Contractors Industry (Division of the Construction Industry)—Code Authority of 11, as provided in the Code, met for organization purposes in Chicago August 15. All preliminary

(Continued on page 57)

[1] And provided they *are* paying to support the Code in their principal line of business.

[2] Which in turn will depend on the validity of criticism of, objections to, and suggestions concerning modification of codes.

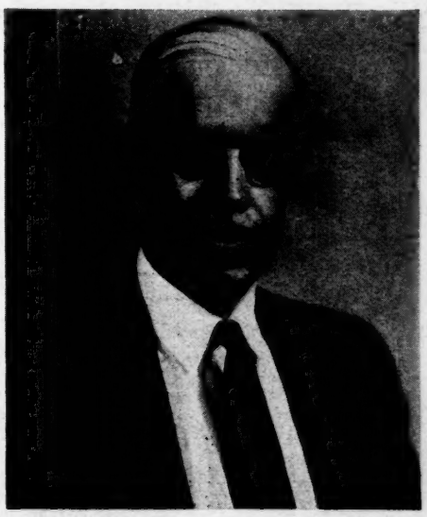
[3] And to prevent Mr. Foster from running out of work between times, he conducted a hearing on the Household Ice Refrigeration Industry Code August 17. W. S. King is deputy in charge of the oil burner code.

[4] See page 54.

[5] Traps, valves, orifices and similar low-pressure steam specialties.

[6] From his office in Detroit's General Motors Building, Code Authority Secretary L. O. Monroe submitted evidence to show how X-36 affects fan and blower makers. Members whose business is principally fans and blowers do a dollar volume of $4 million per year; those with whom fans and blowers are a minor business sell $1 million per year. Under X-36, former group is assessed 1/3 of 1%; if exemption is granted, all members pay ¼ of 1%.

[7] Partial, because only makers with 1933 furnace sales of over $5000 must contribute.



Neal W. Foster, NRA deputy administrator, who will make decisions on NRA ruling X-36. Photo by Harris-Ewing

[8] "—ary," a suffix meaning "pertaining to." Thus, pertaining to unit air conditioning equipment. Similarly we might (but don't) have "stokerary," "oil burnerary," "unit ventilatorary," etc. Reminiscent of S. R. Lewis' proposal some years ago to call unit heaters "elecons," unit ventilators "elevents," convectors "fluecons," etc.

Oil Burner Code in a Tangle

as changes await decision from NRA; modifications would reduce levies, administration expense, change method of selecting Authority members

342 Madison Avenue is headquarters for a Code Authority without authority. Technically there still is an Oil Burner Code Authority. Actually it exists in name only, has been impotent since the hearing held by NRA last May.[1]

In Washington, Deputy Administrator W. S. King[2] is now considering modifications to the Code which will set up a new Authority, reduce levies, cut administrative expense, modify clauses pertaining to participation in the Code.

In New York, Morgan J. Hammers, chairman of the Code Authority, awaits NRA's decision which may call for a new election of Authority members, thus may replace him.[3] At A.O.B.A. headquarters in the same building, executive secretary Harry F. Tapp worries about the industry's ills. Among his worries, major and minor, are these:

(1) Will NRA approve the proposed modifications to the Code?

(2) Oil burner competition with stokers and gas, and about which nothing can be done until the oil burner industry has set up a body recognized by NRA to confer with representatives of competing industries.

(3) Price increases in oil fuel, which have slowed down burner sales, and which are partly caused by the tariff and embargo on fuel oil from other countries. Tapp wants them reduced. President Roosevelt has the power to do this, but is extremely busy. When, Tapp inquires of himself, will the time be ripe to ask the President to consider this?

(4) Conflict of the Oil Burner Code with the Heating, Piping and Air Conditioning Contractors' Code.[4]

Following the NRA hearing in May, President R. M. Sherman of A.O.B.A. appointed a committee to report on A.O.B.A.'s operation in connection with the Code Authority. The committee reported back that "It now seems evident that the Industry as a whole was not in accord with the Code as originally drafted . . . . and approved . . . ."[5]

By June 29, when NRA and oil burner industry representatives met in New York, the oil burner men were feeling inclined to drop the whole project.[6] But NRA Legal Counsel McNulty emphatically pointed out that the industry has a Code, that it cannot be dropped at will. NRA, it appeared, demanded a revision of the Code.

Code Revision: Modifications of the Code (submitted by the present Code Authority) now awaiting action in Washington are admittedly not the last word. They are "something to shoot at."

The accompanying table shows roughly a comparison of the old and the proposed provisions relating to levies, selection of Code Authority members, and expenses of administration.

NRA is asked to terminate the exemption issued May 26 whereby members of the oil burner industry whose principal business is under another code were exempted from paying their share of the expenses of the Burner Code.

Only three objections to the proposed amendments were made at the hearing August 20. The code with the proposed amendments is now before the several NRA Advisory Boards who must approve the changes before they can be authorized. Up to the present only the changed method of electing the Code Authority has been approved. Action on the others is pending.

Oil Prices: No decision has as yet been forthcoming from fuel oil administration on the oil price raises. Oil producers not heard from at the hearing on July 30 have now filed a brief defending the price increase. Their arguments: that oil prices have not advanced unduly in relation to general commodity price changes; claim that price increase on the Atlantic coast is due to embargo on foreign oil; claim resulting increased demand in the East for domestic oil from California caused rise in California cargo price; point out that Venezuela is on the gold standard, putting their crude at a premium over domestic crude; claim that distributors of fuel oil must recover increased cost due to NRA provisions.[7]

(Continued on page 66)

[1] See HEATING AND VENTILATING, June, 1934, page 37.

[2] The Oil Burner Code has been handled by a number of deputies—Paddock, Murray, Foster, and now King. The last is not to be confused with Deputy Administrator Beverly King.

[3] Which may or may not displease Mr. Hammers. On August 20 he was elected president and general manager of Electrol, Incorporated (see page 57).

"Heating, Piping and Air Conditioning Division . . . shall include the furnishing and installing of systems, or parts thereof, for . . . oil-burning units . . . and all apparatus . . . in connection therewith . . . ." (Chapter XVI of the Construction Industry Code)

"Dealers are persons . . . partnerships, associations, or corporations . . . whose oil business is the sale of oil burners at retail," (Oil Burner Code)

These conflicting paragraphs also worry H.P. & A.C.N.A.'s secretary Joseph C. Fitts, who protested to NRA in a letter May 1.

[5] But President Sherman, commenting on the report, said: "The Code as signed by the President [Roosevelt] is a vastly different document than the one presented at the Public Hearing by the Code Committee of the A.O.B.A., and much of this final document was virtually forced on the industry by NRA officials." This might infer that the industry *was* back of the Code it submitted, thus place blame on NRA.

[6] Understandable, NRA seems to have been hiding behind technicalities, has not enforced the Code, indicates the present Code is unenforceable.

[7] This brief was filed by most large distributors, including Atlantic Refining, Cities Service, Fuel Oil Association, Gulf Refining, Long Island Petroleum Association, Pan American, Sinclair, Shell, Socony-Vacuum, Texas, Warner Quinlan, and Westchester Oil Trades Association.

SUMMARY OF CHANGES IN OIL BURNER CODE

OLD PLAN	PROPOSED PLAN
Code Authority of 9 voting, 3 non-voting members. 5 were members of Executive Committee of A.O.B.A., 1 was Chairman of Board of Governors, A.O.B.A., 1 was President of Distillate Oil Burner Manufacturers Association, 1 was President of Pacific Coast Oil Burner Association, 1 was appointed by NRA. 3 non-voting members were appointed by NRA.	Code Authority of 9 members, 5 being representatives of Manufacturers. 4 of Dealers. (Now approved by NRA)
Code Authority members all *appointed ex officio.*	Code Authority members *elected* by industry at large. (Now approved by NRA)
Assessment: On manufacturers, $1 per power burner, $0.10 per distillate burner. Same amount paid by dealer. Total, $2 per power burner.	Assessment: 0.5% of net factory sales but not to exceed $0.75 per burner shipped.
Code Authority Expense: (Actual Disbursements October 1, 1933 to April 25, 1934): Total, $64,576.82.	Code Authority Budget (September 18, 1934 to January, 1935): Total, $30,758.88. (Includes $6430.84 legal expense, $7500.00 cost accounting expense, and $4198.04 miscellaneous expense, all unpaid, for period from September 18, 1933 to July 31, 1934.)

Why Not a Professional Engineer?

THE writer† has read with considerable and careful interest the two articles appearing respectively in July[1] and August[2] issues of HEATING AND VENTILATING by W. Lincoln Boyden, Jr., based upon his experience as an architect in attempting to secure intelligent and reasonable estimates for a residential air conditioning system. As a result of Mr. Boyden's experience, he deplores the situation in general and offers what are, in his opinion, certain constructive and curative suggestions.

It is this writer's belief, after contemplating these articles, that the whole problem is being considered from the wrong standpoint. Therefore, with some diffidence, certain comments are offered below with the sincere desire to bring out some phases of this situation in which it is felt Mr. Boyden has erred. It is hoped that Mr. Boyden will read these comments in the spirit in which they are written, since it is the desire primarily to render helpful assistance, and not to criticize.

Exception is taken to the form of the specifications given, both in the original and corrected form. Any true specifications should give information, and not ask for it. The original so-called specifications for the project described were seemingly issued as requirements of performance, with which was combined a descriptive questionnaire.

This method at once throws the burden of design upon the bidder's shoulders. This design is no inconsiderable problem of engineering, and it is unfair, in the first place, to expect the bidder to toil through the mass of work thus required with no more tangible recompense than the privilege of submitting an estimate.

In the second place, it may be seriously questioned as to how many of the bidders are really capable of undertaking such a design. The very fact that Mr. Boyden's tabulation displays such a wide variation in heating and cooling loads lends evidence to this suspicion. Still further, the statement of Bidder No. 1, that he will cool with tap water, conveys the impression that he, at least, had no real understanding of the problem, unless, indeed, 70° tap water is available, and which may be doubted, or unless the use of some absorbing medium is contemplated.

It naturally follows, under the above method, that each bidder will attempt to meet the minimum requirements with the minimum of materials and equipment, in order to submit an attractive proposal. When it is further considered that in air conditioning, as in many other sciences, there are many ways of accomplishing the same thing, it will be seen that chaotic bids are almost inevitable.

It is with regret that the writer must state that he does not feel that the revised specifications suggested offer much improvement. It is true that some elements of design have been incorporated, which were not present originally. The heat losses, winter and summer, are now computed, and air quantities are determined, and presumably a duct layout is included. But from there the author reverts to another questionnaire.

The bidder is required to select the type of mechanical refrigeration—he shall decide whether or not the air is to be filtered—he shall decide what interior wet and dry bulb temperature shall be maintained for given outdoor conditions—he shall decide the material and gauge of duct metal—and last, but not least, he must establish the nature of the temperature and humidity control to be installed. This last, and most vital factor, has seemingly not received the careful consideration which it must merit.

Air conditioning systems in commercial establishments and public buildings are usually under the supervision of a trained mechanic. Such expense in residential cooling is not justified. Thus the problem presents itself to provide control such that the rooms will be neither too cool nor too warm over the wide range of outdoor conditions which may be encountered. Without an exact knowledge of the exact type of system contemplated, a discussion of control methods cannot be well entered upon. Suffice it to say that any cooling system will require control adjustment from time to time which is not automatic, and which must devolve upon the owner or his servants. Carelessness in this respect may well cause a considerable increase in operating cost.

Certain items are enumerated, the answers to which the owner is expected to supply. Some of these questions are much too technical for the average owner to determine, and should indeed be determined for him by his advisers, who should be guided by the limitations of his pocket book. The question of whether or not to employ a washer—of the temperature differential to be maintained—as to which method of operation will be more effective—and as to the amount of dehumidification required, if any—these are matters for the designers of the system to determine.

The above comments may appear to be largely destructive in nature, and an attempt will now be made to make certain constructive suggestions.

An architect who ventures upon a project involving conditioning is treading upon dangerous ground unless he retains a reliable consultant. Air conditioning is still an infant, even though it is a lusty one, and there is still much to be learned. No professional man cares to be in that select group who will secure such learning at the expense of bitter experience.

Mr. Boyden has really stated the solution to his problem when he remarks, "If the owner is to have eventually an installation which fits both the building and the pocket book, it seems that he will do best to place his problems in the hands of informed independent engineers," yet almost in the same breath he discards this thought and proceeds with his suggested questionnaire-specifications.

The only specifications which will do justice to the owner, the contractor, and the architect are the specifications which are based upon a complete design of the system and which definitely describe the type of equipment desired, and the functions which it shall perform. By so doing, competition will in no wise be eliminated, and consistent competitive bids are reasonably assured. It may be assumed that such specifications, with accompanying plans showing design details, may most effectively be prepared by professional engineers. Least of all should they be prepared by contractors or manufacturers, who have an inevitable axe to grind.

As a contrast to the tabulation of bids received by Mr. Boyden, a reproduction of which was included in his first article, the writer offers below a tabulation of estimates recently received for the heating and complete conditioning of a residence in New York.

	Heating and Air Conditioning	Deduction if Air Conditioning is Omitted
Bidder No. 1	$10,853	$6,882
Bidder No. 2	11,048	7,900
Bidder No. 3	11,157	6,882
Bidder No. 4	11,503	6,871
Bidder No. 5	11,659	not stated
Bidder No. 6	11,721	7,799

These bids are reasonably close, but the bidders were estimating on detailed plans and specifications, and there were no features of the system which they were compelled to design.

So in conclusion, the statement is ventured that there is no confusing situation in securing air conditioning bids, as has been implied. If the system is carefully and completely designed, then proper estimates will be received. A method such as was outlined for design of an air conditioning system would not be considered for a normal heating system, a plumbing system, or an electrical wiring system. Therefore, why thus penalize the air conditioning industry?

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†L. S. Tarleton, staff of H. Berkeley Hackett, consulting engineer, Philadelphia.

[1] "Some Practical Aspects of Air Conditioning," page 19.

[2] "Exactly What Does Your Bid on Air Conditioning Include," page 44.

NEWS OF THE MONTH

Contractors' Code Authority Organizes

NEW YORK—On August 15—less than a week after the President had approved the code for the Heating, Piping & Air Conditioning Contractors Division of the Construction Industry—the Divisional Code Authority was organized at a meeting held at the Sherman Hotel in Chicago.

The code provides that the authority should consist of 11 members, seven of whom were to be members of Heating, Piping & Air Conditioning Contractors National Association and four of whom represent non-members. Those representing the non-members to be chosen in a manner satisfactory to the Administrator; and those representing the Association to be appointed by its Board of Directors.

As appointed and approved, the members representing the association are: Robert D. Williams, New York; Maurice J. Chagnard, Louisville; John H. Zink, Baltimore; J. Lawrence DeNeille, St. Louis; George H. Dickerson, Chicago; Walter Klie, Cleveland, and Thomas O'Callaghan, Boston.

Those representing the non-members are: Eugene H. Hattersley, Fort Wayne, Ind., J. I. Lyle, Newark, N.J.; Archibald A. Marx, New Orleans, La., and Wray M. Scott, Omaha, Neb.

At its meeting the board organized, appointed Robert D. Williams chairman, Maurice J. Chagnard vice-chairman, John H. Zink treasurer, and Joseph C. Fitts secretary.

By-laws were adopted and a committee authorized to present them to NRA for approval. A budget for one year's operation was adopted and submitted for approval. In order to expedite the work of the Authority, committees were designated as follows: Executive and Finance; Budget; Statistics and Reports; and National Trade Practice Complaints.

The Executive Committee was authorized to establish an office adjoining the office of the Heating, Piping and Air Conditioning Contractors National Association at New York.

Since the code authorized the incorporation of the Divisional Code Authority, a committee consisting of J. Lawrence DeNeille, Robert D. Willams, and John H. Zink was authorized to proceed to secure incorporation. In order that the administration of the code might be handled by districts, the country was split into 11 regions as follows, with a regional chairman for each:

District No. 1. New England, Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. Chairman not designated.

District No. 2. New Jersey and New York. Chairman: E. W. Tompkins, Albany, N. Y.

District No. 3. Ohio, Pennsylvania, and West Virginia. Chairman: Not designated.

District No. 4. Illinois, Indiana, Michigan, and Wisconsin. Chairman: S. Austin Pope, Chicago.

District No. 5. Iowa, Minnesota, North Dakota, and South Dakota. Chairman: H. Merwin Porter, Minneapolis.

District No. 6. Colorado, Idaho, Montana, Utah, and Wyoming. Chairman: Russell O'Rear, Denver.

District No. 7. California, Nevada, Oregon, and Washington. Chairman: George Kendall, Portland, Ore.

District No. 8. Arizona, New Mexico, and Texas. Chairman: Justin A. Kiesling, Houston, Texas.

District No. 9. Arkansas, Kansas, Louisiana, Missouri, Nebraska, and Oklahoma. Chairman: Edwin P. Ambler, St. Louis.

District No. 10. Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Chairman: Otto G. Krause, Louisville, Ky.

District No. 11. Delaware, District of Columbia, Maryland, and Virginia. Chairman: No appointment made.

With the completion of this preliminary organization work the Authority entered into its serious work of administration. The ground-work is all laid, the long wait is ended, and actual administration of the code is under way.

Glass Company to Make Double Window

TOLEDO—A double-glazed window, known as Thermopane, which is said to substantially reduce heat loss through windows and prevent frosting in cold weather, is being acquired by the Libbey-Owens-Ford Glass Company through a newly organized subsidiary, The Thermopane Company.

The product consists of two panes of glass so fitted to each window sash that it provides an air space between.

Building engineers, it is claimed, have found that the Thermopane principle, besides preventing frost formation, eliminates condensation on the glass of windows, unless the inside humidity is excessively high.

Ames Leaves Pump Company

NEW YORK—Charles F. Ames, 140 East 46th Street, announced his resignation on August 15 as vice president of Ames Pump Co., 30 Church Street. On the same date R. H. Fredricks, chief engineer, also resigned.

A.C. to Aid Russians in Study of Health and Climate

LENINGRAD—A medical center of vast proportions is being built here. It will have 8500 rooms and a staff of 3500.

According to Prof. N. I. Krasnogorsky, director, the center will maintain rooms kept at the temperature and moisture condition of every climate in the Soviet Union, from the sub-tropics to the polar north. Rooms will be kept as outside conditions are at every Soviet altitude so that patients can be studied under these varying conditions.

The center is part of the second five-year plan to raise the well being of the workers. It will be called the All-Union Institute of Experimental Medicine.

Home A. C. Increases Rapidly in St. Louis

ST. LOUIS—According to figures released by the Union Electric Light & Power Company small home installations of air conditioning equipment in the city will account for 55% of all installations. In terms of capacity, homes accounted for less than 20% of the total.

E. A. Freund, engineer for the public utility, expressed the belief that the number of commercial installations of cooling systems is greater early in the season, while home installations increase as the summer heat increases.

With the mercury soaring to record heights in the Mound City the inquiries regarding air conditioning and room cooling received by Union Electric Light & Power Co. and the Laclede Gas Company reached new highs.

For the St. Louis metropolitan district sales in dollars and cents of air conditioning equipment up till July 15 are reported to be almost 50% above the same period of time last year, by far the best year on record for sales.

In the majority of the home installations, the unit types, designed for one room, are leading in sales, although there have been instances of a few installations for more rooms.

In checking over the home installations as compared to the commercial, some interesting data were unearthed. In 1933 there were 77 cooling systems and units installed in all, including those using the service of the St. Louis Refrigerating and Cold Storage Company. Out of this number 34 were in homes, mostly the unit type installations, or 44%. During the entire period prior to January 1, 1933 the home installations accounted for only 26%.

Hammers Now President of Electrol

NEW YORK—Morgan J. Hammers was elected president and general manager of Electrol Incorporated, manufacturer of oil burners, oil burner-boiler units, and air conditioning equipment, according to W. T. Koken, chairman of the board, in New York August 20.

Mr. Hammers, formerly and for a number of years vice-president and general manager of Petroleum Heat and Power Company, recently completed his second year as president of the American Oil Burner Association, and is chairman of the Oil Burner Code Authority.

Fifteen years ago Mr. Hammers developed and marketed the Nokol burner.

British Pool Electrically Heated

LONDON, ENGLAND—The Empire Swimming Pool at Wembley, formally opened by the Duke of Gloucester July 25, one of the largest in Great Britain, is heated by 42 unit heaters under the main galleries which are supplied with steam from two electrically-heated boilers, each of which has an electric rating of 870 kw.

Iron Fireman Appoints Dealer; Holds Meetings

BOSTON—Curtis & Brock, Inc., dealer in automatic heat, refrigeration, and air conditioning, has acquired the distribution of the Iron Fireman coal burner in metropolitan Boston. The firm will maintain a service department for present Iron Firemen owners. F. Lowell Curtis is president of the company. Service and installation of stokers will come under the supervision of Robert H. Brock, treasurer of the concern. Stoker sales will be in charge of B. Y. Preston, who during the last four years has been associated with Iron Fireman interests in Greater Boston.

BOSTON—At a sales meeting of New England's Iron Fireman dealers and salesmen, held August 10 at Hotel Statler, C. T. Burg, general sales manager of the Iron Fireman Manufacturing Company, stressed the continued development of consumer interest in automatic coal burning, and the steady growth of the company.

This was the seventh annual meeting of the dealers, and was one of a series of regional conferences. Mr. Burg also outlined the national advertising campaign and results received from it, while new features of the equipment were explained in detail. He also told the assemblage that sales this year to date had already exceeded those of last year, which were the largest in the history of the company. Accompanying Mr. Burg were W. B. Hughes of New York, assistant sales manager of the company, B. R. Robinson and R. C. Wright of the factory engineering staff.

DENVER—Twenty-six dealers from western Kansas, western Nebraska, Wyoming, and Colorado attended the annual regional convention of the Iron Fireman Manufacturing Company here August 20. C. T. Burg, general sales manager of the company, with headquarters in Cleveland, and E. C. Sammons, vice-president, with headquarters in Portland, Ore., directed the convention.

Dealers reported that sales for the first seven months this year are 18% ahead of last year. They were optimistic over prospects during the remainder of the year.

There are now approximately 1,000 Iron Fireman units installed in Denver and immediate vicinity, and the present rate of increase is about 150 a year.

Who Contributes to Code Expenses

(Concluded from page 53)

organization work was completed at this meeting. Application was made to the Administrator for approval of its budget.[9]

Other Industries—Code Authority By-laws have been approved for the Cast Iron Boiler and Radiator Industry and for the Unit Heater and Unit Ventilator Industry, both with exceptions.

On August 7 the Code for the Charcoal and Packaged Fuel Distributing Trade was approved.

Code for Wholesale Plumbing Products Industry approved August 27, effective September 4. Approval contains important provisions exempting hardware wholesalers and staying the 10-day waiting period between filing date and effective date of price lists; 40-hr. work week; $15 minimum scale, large cities; $14, small cities.

[9] *Total*—$307,500, for period from August 9, 1934 to June 16, 1935. *Basis of Assessment*—¼ of 1 per cent of all contracts of $250 or over. *Principal Items*—Salaries, $26,900; office expenses, $27,550; traveling expenses, $29,273; legal fees, accountants' fees, etc., $21,500; expenses of regional and local organizations, $153,749.89; assessment to the Construction Code Authority for registration of contracts over $2000, $25,000; to the National Trade Practices Committee, $10,000; for the Labor Complaints Committee, $5000; for establishment of the code before August 1, $8,527.11.

PENN ELECTRIC SWITCH DEALERS HOLD MEETING

Dealer salesmen and service engineers at the company's meeting held July 30 in the Hotel Taft, New York. The meeting was one of 16 similar ones held in various parts of the country from Portland, Me., to Omaha, Nebr. The company's new Temtrol system was featured.

Boston Edison Campaigns by Mail for Air Conditioning

BOSTON—A direct mail campaign in the interests of the air conditioning industry was conducted during May, June, and July by the promotion department of the Edison Electric Illuminating Company of Boston, with quite satisfactory results. This was a continuation of the campaign conducted last year when a booklet was offered in each of the three letters sent to a list of 3,200 prospects, for which 615 replies and requests were received. This year the reply card was worded in such a way that the prospect who returned the card was actually asking for the Edison representative to call.

Consequently, the number of replies was smaller, but the volume of business obtained from these replies was greater than last year's. The Edison representatives did not attempt to sell equipment directly, but instead to offer the advisory services of the company's Air Conditioning Division.

A breakdown of the mailing list shows some interesting facts. Of the 8000 letters sent out, a few over a thousand went to dentists, about the same number to doctors, and 84 to chiropodists. Beauty shops received 848, funeral directors 264, department stores 125, men's clothing stores 185, women's clothing stores 284, shoe stores 161, and fur shops 146. Drug stores were included to the number of 380, investment houses 342, and residential prospects 2,236. There were 53 clubs, 17 laboratories, 126 rectories, 93 hospitals, 390 restaurants, 119 hotels, and 2,236 miscellaneous included, also 48 candy stores.

A total of 140 replies were received, or about 1.75% for an average. A further breakdown shows the following percentages of replies: beauty shops, 1 65; fur shops, 0.19; candy stores, 4.17; drug stores, 2.89; investment houses, 3.50; restaurants, 2.05; hotels, 1.67; hospitals, 2.15.

Letters were sent to two different groups, spaced about two weeks apart, to the number of four each, the two groups alternating.

Over 600 hp. has been added to the load of the utility through air conditioning equipment in various buildings. The revenue is estimated at approximately $20 per hp. per year.

Would Open Up Lignite Deposits

DENVER—If a petition now before PWA is granted, vast deposits of lignite coal in 10 western states may soon become a rich source of domestic fuel. Lignite has a restricted use.

The petition seeks a grant of $200,000 with which to coordinate and reduce to practical commercial use the results of 20 years of scattered experiments with lignite coal. The plan is reported to have been approved by the Bureau of Mines and backed by coal interests and civic groups in the 10 states, which include the Dakotas, Montana, Wyoming, Idaho, Colorado, Utah, Oregon, New Mexico, and Texas.

Originator of the plan is Oliver S. Bowman, president of the Heliopore Laboratories at Colorado Springs. He claims that under known methods lignite can be processed into a high-grade smokeless fuel, burned as raw fuel, and valuable by-products derived from it which would more than pay for processing.

Spokane Holds A. C. Show

SPOKANE—This city's first air conditioning exhibition was held in the Kroll Building under the sponsorship of the recently formed Spokane Air Conditioning Bureau. Since dust storms are prevalent in this section lectures by experts and demonstrations focussed attention on how modern air conditioning equipment eliminates dust in the home. H. C. Bender, air conditioning engineer, was manager of the show, which was open from noon until 10 nightly.

Featured in connection with the exhibition was the first air conditioned installation in this city for cooling air in a home. This is in the private residence of Dr. William Robinson.

Kjerner Appointed by Chrysler

NEW YORK—John C. Kjerner has been appointed sales manager of the United Air Conditioning Sales Corporation, according to Walter P. Chrysler, Jr., president. This company is the distributor for Chrysler air conditioning equipment in the New York metropolitan area.

Mr. Kjerner entered the employ of Baker, Smith & Company in 1926. He later became a vice-president and partner of A. F. Hinrichsen, Inc., an equipment sales organization.

Temple Library to be Humidified

PHILADELPHIA—Temple University has revised its plans for the Sullivan Memorial Library to be erected at Berks and Watts Streets and Park Avenue. The new plans include provision for a humidifying system to prevent the drying out of books, and a device to remove gas from air entering the building.

The latter is necessary, it is claimed, since the air over the city is heavily laden with gas from heating plants which has destructive effects on paper and bound volumes. A constant relative humidity will be maintained.

Mayflower Buys Plant

EDGEWATER, N. J.—The Mayflower Oil Burner Corporation and the Mayflower Fuel Oil Company of Union City have purchased the property of the United States Boat Corporation here. The companies are planning to have fuel oil tanks on the waterfront, and also to manufacture the burners there.

Extensive alterations will be made. The tanks will be of the horizontal type, covered so that they will not be visible.

A. C. Division Planned for Detroit

DETROIT—An air conditioning division of the newly formed Refrigeration Association of Michigan will be organized soon, according to A. J. Bauer, executive secretary. In furtherance of this plan, C. J. Gleason, Universal Cooler Corporation, has been elected vice-chairman of the executive committee in charge of air conditioning. Invitations will be extended shortly to a'l wholesalers and branch distributors of air conditioning equipment of all types to affiliate.

The Refrigeration Association of Michigan was formed June 19 by a group of wholesale executives and branch managers of commercial and domestic mechanical refrigerat'on firms. Its purposes are "to further the interests of wholesalers and dealers, to collect and disseminate information, promote a spirit of cooperation, and to improve the quality of the automatic refrigeration and allied industries' service to the public."

S. C. Caswell, G.E. distributor, was elected chairman of the executive committee. The vice-chairmen are Mr. Gleason; R. W. Walsh, manager, Kelvinator Sales Corporation, for commercial refrigeration; C. W. Strawn, refrigeration manager, Buhl Sons Company, for domestic refrigeration, and R. F. Callaway, manager, Frigidaire Sales Corporation, for the apartment house division.

Offices have been established at 1106 Penobscot Building, with the refrigeration division of the National Electrical Manufacturers Association, and A. J. Bauer has been engaged as executive secretary. Mr. Bauer is at present building up membership in the commercial and domestic refrigeration wholesale field and then will give his attention to the air conditioning division membership work.

A second meeting was held August 13 with 18 firms represented. Constitution and by-laws have been prepared and several projects for improving conditions here are already under way, Mr. Bauer reports. Meetings at present are being held upon call of the chairman of the executive committee.

Dail Makes Appointments

LANSING, MICH.—Dail Steel Products Company has appointed Ellmann, Inc., Washington, D. C., as its sales representative for Virginia, eastern Maryland, and Washington.

Charles H. Brown has been appointed company representative in Cincinnati, while O. H. Wolff will cover the trade area surrounding St. Louis.

Atmospheric Conditions Duplicated by A. C.

YORK—A specially designed room is being constructed by the York Ice Machinery Corporation for the U. S. Naval Research Laboratory at Bellevue, D. C., to simulate by the use of air conditioning equipment and insulated floors, walls, and ceiling, the atmospheric conditions encountered during high altitude flights, and in penetrating the stratosphere to study the problems of radio communication at extremely low temperatures and greatly reduced atmospheric pressures.

The test room itself will consist of an airtight, completely insulated vault, measuring 15 ft. × 20 ft. × 10 ft., and will be equipped with an air conditioning system by which it will be possible to maintain within the room any desired level of temperature between —50° and 150°. Control of humidity will be provided, together with evacuating equipment, so that desired atmospheric conditions or low pressures in extremely high altitudes, even to one-half an atmosphere, can be duplicated within the room.

Purchase of Ryan, Scully Completed

PHILADELPHIA—R-S Products Corporation has completed the purchase of the assets of Ryan, Scully & Company. The corporation entered into a contract over a year ago to take over the organization and control of Ryan, Scully.

The engineering department, previously under the direction of G. F. Beach, deceased, is now under the direction of J. A. Ehlinger, who has been associated with F. J. Ryan, president of the company, in an engineering capacity for over 15 years and was Mr. Beach's assistant for many years.

House of Commons Again Attacks Ventilation Problem

LONDON — Once again the British House of Commons is airing its ventilation grievances, which for many years past have given rise to periodical flights of oratory on the part of the more sensitive members. The latest to take up the problem is Robert Bernays, one of the most brilliant of the younger Liberal members. He initiated a debate on the subject by asking First Commissioner of Works Ormsby-Gore whether he was satisfied that every effort had been made to improve the ventilation of the House.

"A very comprehensive engineering report on this subject was presented to Parliament in June, 1931," replied Mr. Ormsby-Gore. "I have recently had analyses made of the air in the Chamber and lobbies at different times of the day. I am further carrying out a similar but more complete survey of the ventilation of the whole building, as a result of which I hope it may be possible for more definite conclusions to be reached."

"Is it not a fact," Mr. Bernays then asked, "that the atmosphere of this House compares very badly with that of any motion picture theater in the country?"

"That is certainly my own impression," admitted Mr. Ormsby-Gore, "but all the scientific and technical experts who have investigated the matter find to the contrary."

Viscountess Astor closed the discussion on a humorous note by asking: "Is it not true that it is the mentality of the House which is sometimes oppressive, and not merely the atmosphere?"

Laughter was the only answer given to this question, but members were relieved to hear that Ormsby-Gore was now carrying out a more detailed survey of the building's ventilation system. They are sanguine that a modern installation will be the ultimate result of this investigation.

University Physicists Study Dry Ice as Competitor of Air Cooling Systems

"Sunstroke: Cool the patient as quickly as possible with cloths wrung out of cold water, ice bags, or a cool bath. No stimulants."

So (or similarly) reads first aid instructions for the distracted woman with a heat prostration case on her hands. If the treatment were not so much trouble, many well (but uncomfortable) human beings would be cooling themselves in a similar manner during the hottest days of summer.

Physicists at Purdue University last month were trying a variation of this general idea. They did not use cool water or ice bags, did use dry ice. A pellet of dry ice was placed in a "wrist watch,"[1] cooled the blood stream of the wearer as the blood flowed through a subadjacent artery.

Dry ice "burns" the skin almost instantly wherever it makes direct contact. The Purdue invention insulates the ice, so that only a normally cooling stream of cold air and cold carbon dioxide gas flows over the sensitive spot on the wrist. A small pellet of the dry ice lasts about 1 hr. The effects of cool gas flowing out of the container continue for about 20 min. more.

No specific data as to results have been forthcoming from Purdue. The story broke prematurely before sufficient tests were made.

Skeptical remarks greeted the announcement. One engineer characterized it as "the best laugh of the month." Many doctors were doubtful. In the opinion of one physiological research worker "It seems as if the latent heat of a small pellet of carbon dioxide would be hardly enough to cool the entire body. The blood temperature usually does not alter but slightly as there is a regulation with the external temperature as it goes up, inasmuch as there is an increased vaporization of water from the body."

Dry ice—solidified carbon dioxide—has had a rather spectacular career, seems to the layman a good refrigerant for air conditioning.[2]

It has a temperature of 109° below zero. a latent heat twice that of ice. It is one of the few substances which sublimes,[3] consequently needs no drain pipes connected to plumbing. Principal use: for ice cream and other perishables, particularly in trucks and portable containers. Greatest drawback: probably the cost, which is from 2 to 2½ cents per pound. Latest application: now being tested to cool shipments of perishables from the Pacific Coast to Hawaii.[4]

The most important factor in the dry ice industry is Air Reduction Company, which recently acquired American Dry Ice Company, through its subsidiary, Pure Carbonic Corporation, in which Air Reduction has more than 70% interest. Other companies making dry ice are Liquid Carbonic Corporation, Michigan Alkali Company, Mathieson Alkali Company, and Nu Ice Incorporated of California. Estimated consumption of dry ice: 1930—70 million lb.; 1931—90 million lb.; 1932—120 million lb.; 1933—100 million lb.

[1]The device was developed originally by Dr. Karl Lark-Horovitz, head of the Physics Department, and A. I. May, a technician. Tests have been made by Dr. H. H. Remmers, head of the Division of Educational Reference.

[2]And has been tried for this purpose. A "spot" cooler was introduced several months ago, removed from the market shortly thereafter.

[3]That is, passes directly from the solid, or frozen, state into a gas instead of passing through the intermediate liquid state.

[4]And has been successful, it is claimed, with butter, eggs, and poultry, at material economy.

A. C. Bureau in Birmingham Active

BIRMINGHAM, ALA.—The Air Conditioning Bureau of Birmingham organized early in the year has already achieved one of its purposes—that of inducing at least one concern in each type of business to install a cooling system. This done, officials of the Bureau figure that it is only a question of time before competitors will have to do likewise.

When the bureau was estab'ished one department store had already made an installation and since that time a restaurant, a shoe shop, a dress shop, and the offices of a large chemical corporation have gone in for air conditioning. The bureau estimates that there are 100 prospects in Birmingham for air conditioning and now that a few concerns have led the way others will come much easier.

Air conditioning has been given quite a boost in Birmingham by the announcement of Loveman, Joseph & Loeb that its new $1 million store will carry air conditioning on all its floors. Construction will begin October 1 with the building to be completed in one year. William H. Lehman, of Newark, N. J., is the architect, with Miller & Martin of Birmingham as associates.

Officers of the Birmingham Air Conditioning Bureau are: President, J. A. Lewis, of Miller & Martin; vice-president, J. H. Atkins; secretary-treasurer, Hugh Roberts, of the Birmingham Electric Company.

Health Experts to Assist on Exhaust System Code

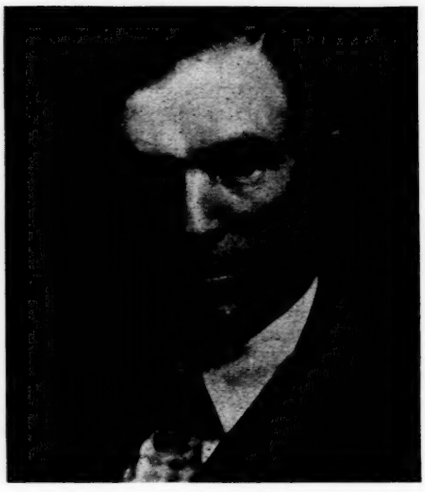
NEW YORK—A safety code project of the American Standards Association will be based upon considerations of health, when a subcommittee of health experts will be appointed to advise the Committee of the Safety Code for Exhaust Systems.

Blocked in their attempt to write an adequate code for exhaust systems for factories until danger limits of the amount of dust or fumes in air breathed by workers is definitely established, the committee approved a subcommittee's recommendation to name an advisory board of toxicologists, physiologists, and other medical and health experts.

Filene's Adds to A. C. Plant

BOSTON—Wm. Filene and Sons Department Store has awarded a contract for air conditioning. The project will cost over $400 thousand and calls for the installation of over 750 tons of refrigeration.

Basements, receiving and shipping spaces were previously air conditioned. The present contract calls for conditioning sales spaces, restaurants, and offices. A spray type cooling tower will be located on the roof. Plans and specifications were prepared by Richard Brunel.



Rudolph Sommers, vice-president, Air Conditioning Bureau of Boston

Penn. Capitol to Have A. C.

HARRISBURG—The Pennsylvania State Department of Property and Supplies has announced that an air conditioning system will be installed in the Senate and House chambers of the Pennsylvania State Capitol building under a contract awarded to Mehring & Hanson Co., Chicago.

Between two and three months are expected to be required to complete the work, for which $40,000 was appropriated by the 1933 special session of the Pennsylvania Legislature. The contract calls for $39,810.

A. C. for Denver Factory

DENVER—After trying numerous other methods without success, the Tampax Sales Company, manufacturer of a patented cotton pad for use in feminine hygiene, has installed an air washing plant to maintain necessary humidity and at the same time keep the air healthy and comfortable for employes.

Under normal atmospheric conditions, the cotton was so dry and bristly it could not be compressed. Direct application of water, evaporation from open containers, and introduction of steam into the processing room either failed to provide uniform moisture, or was oppressive to workers.

Cold Winter Predicted

NEWARK—Weather forecasters in the eastern part of the United States look for a cold and rigorous winter.

This unpleasant prediction is based on a symposium conducted in connection with the first weather forecasters' convention, held Aug. 15 by L. Bamberger & Company, Newark department store.

Not all the predicters agreed. The entire question of the value of long-range forecasts, in fact, is unsettled. Some meteorologists say that the only dependable forecasts cover the immediate future and are based on day-by-day observations; that tomorrow's weather is being made today, and by the time next month comes around all the factors may be different.

On the other hand, C. G. Abbott, secretary of the Smithsonian Institution, contends that weather repeats itself every 23 years. Dr. Franz Baur, German scientist, has come forward with a month-in-advance theory which he considers reliable and accurate. And many of the forecasters base their prediction of a hard winter on that old favorite, the law of averages.

Some of them expect hard winters for the next five years, and one pessimist asserts that for 10 years we are in for cold winters and dry summers.

Rakovan with Stoker Firm

CHICAGO—George Rakovan, formerly sales promotion manager, Toridheet Div., Cleveland Steel Products Corporation, has been appointed advertising and sales promotion manager of the Modern Coal Burner Company, subsidiary of Peabody Coal Company.

Prior to his connection with Toridheet, Mr. Rakovan was with the Silent Automatic Corporation.

Holland Loses

HOLLAND, MICH. — Holland Furnace Company reports for the fiscal quarter ended June 30 a net loss (after interest, depreciation, taxes and other charges) of $112,375, compared with $65,081 loss in the like quarter last year.

Fans Cool Boxers

LONDON—An electrical fan recently introduced for boxers in the United Kingdom is proving popular with sportsmen. It is the invention of Lieutenant Sherriff, a Royal Air Force boxing official. The fan is 6 in. in diameter and is fixed in a guarded case which can be brought from the corner of the ring and held in front of the boxer during the minute's rest between rounds.

Fixed on a telephone extension arm resembling those used in hairdressing establishments, the fan can be placed wherever it is required. It does away with the old-fashioned custom of flapping a towel in front of a boxer.

Standard Oil and G. & B. Unify Burner Service

NEWARK—Unified control of every operation involved in the installation and servicing of oil burners is to be made the theme of an aggressive newspaper campaign, following a new vertical set-up established by Standard Oil Company of New Jersey.

The new type of organization was made possible through the company's control of Gilbert & Barker Co., Springfield, Mass., oil burner manufacturers. The complete service will be advertised by "Esso Marketers."

Tests made by Standard Oil reveal, it is stated, that oil heaters help sell fuel oil and good oil service helps sell heaters, while adequate maintenance helps keep both sold. It is this fact which the new campaign will endeavor to capitalize.

The "United Responsibility Plan" will be featured in the advertising, which will assure householders that the Esso Marketers are prepared to shoulder all the responsibility for the full life of any oil burner.

New V. P. for Byers

PITTSBURGH—At a meeting of the board of directors of A. M. Byers Company July 30, M. J. Czarniecki was elected vice-president in charge of sales, succeeding H. W. Rinearson, resigned. Mr. Czarniecki was formerly general manager of sales.

Wilson New V. P. of Motorstokor

NEW YORK—H. J. Wilson has been made vice-president and general manager of Motorstokor Corporation, succeeding W. L. Higgins who resigned July 17. The change is part of a reorganization effected by the company, of which Walter Barnum is the principal owner and president of the company. Mr. Wilson has been treasurer of the company since its organization.

Other officers of the company are F. V. Courtade, assistant secretary and assistant treasurer; Harry L. Siegmund, sales manager; Gordon M. Peltz, chief engineer; J. C. McCurdy, manager of New York retail operations.

W. A. Doppler has been granted an extended leave of absence on account of ill health.

Marsh Appoints Cleveland Agent

CHICAGO—Jas. P. Marsh Corporation has appointed Tomlinson-MacLachlan, Inc., 1603 St. Clair Ave., Cleveland, as exclusive territory sales agents for Cleveland and Northeastern Ohio.

Underground Store Space to be Conditioned

BOSTON — Announcement has been made of a deal closed to create a great shopping center in the basement beneath the great concourse of the South Station in this city. This space, created many years ago by the engineers of the terminal to accommodate an electrified train system planned for some time in the future, has been idle space ever since, and contains thousands of feet of floor space, all on one level, below the street level, and reached by several existing entrances from the street and the concourse of the station. This new shopping center will be air conditioned and will have many innovations in retail merchandising.

Gas Rates Cut

NEW LONDON, CONN.—The Connecticut Power Company is the latest among New England gas companies to announce a reduction in rates for house-heating.

Under the new rate schedule, which became effective August 1, the charge for all gas used in excess of 10,000 cu. ft. is reduced from seven to five and one-half cents per 100 cu. ft., a cut of about 20%. The old rate of 11 cents per 100 for the first 10,000 remains unchanged.

Cecil W. Brown, manager of the utility's New London division, said that the new rate was announced in midsummer in order that homeowners could consider the installation of gas heat before it became time to contract for their winter's fuel requirements. It is believed that a number of residents who dropped gas heat for economy reasons may now be brought back into the fold.

The Springfield, Mass., Gas Light Company, and the Greenwich, Conn., Gas Company announced rate reductions for house-heating customers this summer.

Hartford Utility Backs A. C.

HARTFORD—Having completed installations in its own office building and in the establishments of five Hartford business firms, the Hartford Electric Light Company has inaugurated a drive for air conditioning sales, using newspaper space as the principal medium.

The company's policy has been to place installations in various key stores and restaurants which can be utilized for demonstration purposes. Each user has been advised that if he wishes to use newspaper advertising to convey to the public the increased comfort obtainable in his establishment through the air conditioning installation, the utility will share the cost of such space.

All present users report business increases attributable to their conditioning system. In the case of the Franklin Cafeteria, business during June, July, and the first two weeks of August this summer exceeded that of last year by 30%, it is reported.

A. C. for St. Louis Store and Grill

ST. LOUIS—The first air conditioned jewelry store in St. Louis will be Drosten's, located in the Board of Education Building. The Mid-West Air Conditioning Corporation is handling the installation.

Announcement has been made of a new grill room to be constructed at the Missouri Athletic Association at a cost of $35,000. The new room will be large enough to accommodate 192 people and will be air conditioned.

Stokers for Commercial Buildings

DENVER—Iron Fireman automatic stokers recently have replaced hand-fired coal heating units of the Western Newspaper Union and the Fred Davis Furniture Company here. Installations were made by United Fuel and Equipment, local dealer.

Delco Opens Detroit Salesroom

DETROIT—General Motors Corporation has opened a new Delco display and salesroom at 4470 Cass Avenue, in the Convention Hall Building. L. A. Kreis has been placed in charge as manager.

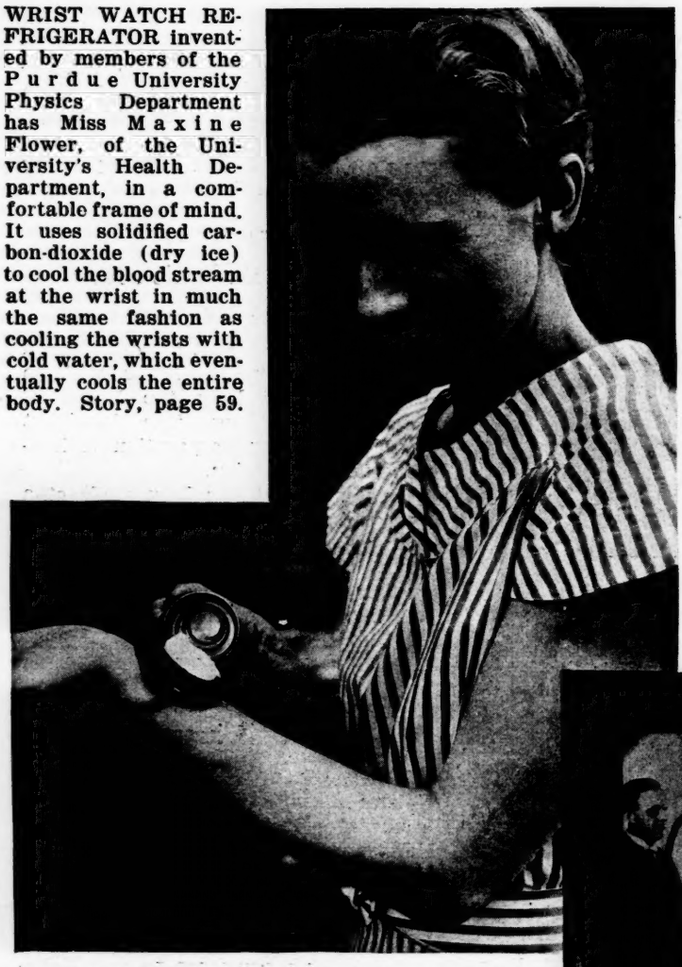
The Delco Heat-Conditionair is set up for operating demonstrations in the new display room. Since the introduction of this unit, sales of the corporation's air conditioning department have increased. In the first seven months of 1934 sales exceeded those of the same period of 1933 by 40%, it is claimed.

Norge Starts O. B. Drive in New England

BOSTON—General Equipment Corporation, factory distributor for Norge products, including the new Norge oil burner, is utilizing its large list of retail dealers, some of whom have been handling Norge products for three to six years, for merchandising the new oil burner, which is made for Norge by Silent Glow.

About the middle of September an extensive advertising campaign in New England newspapers, which will last from six to ten weeks, will be started to back the new burner.

PICTURE PARAGRAPHS

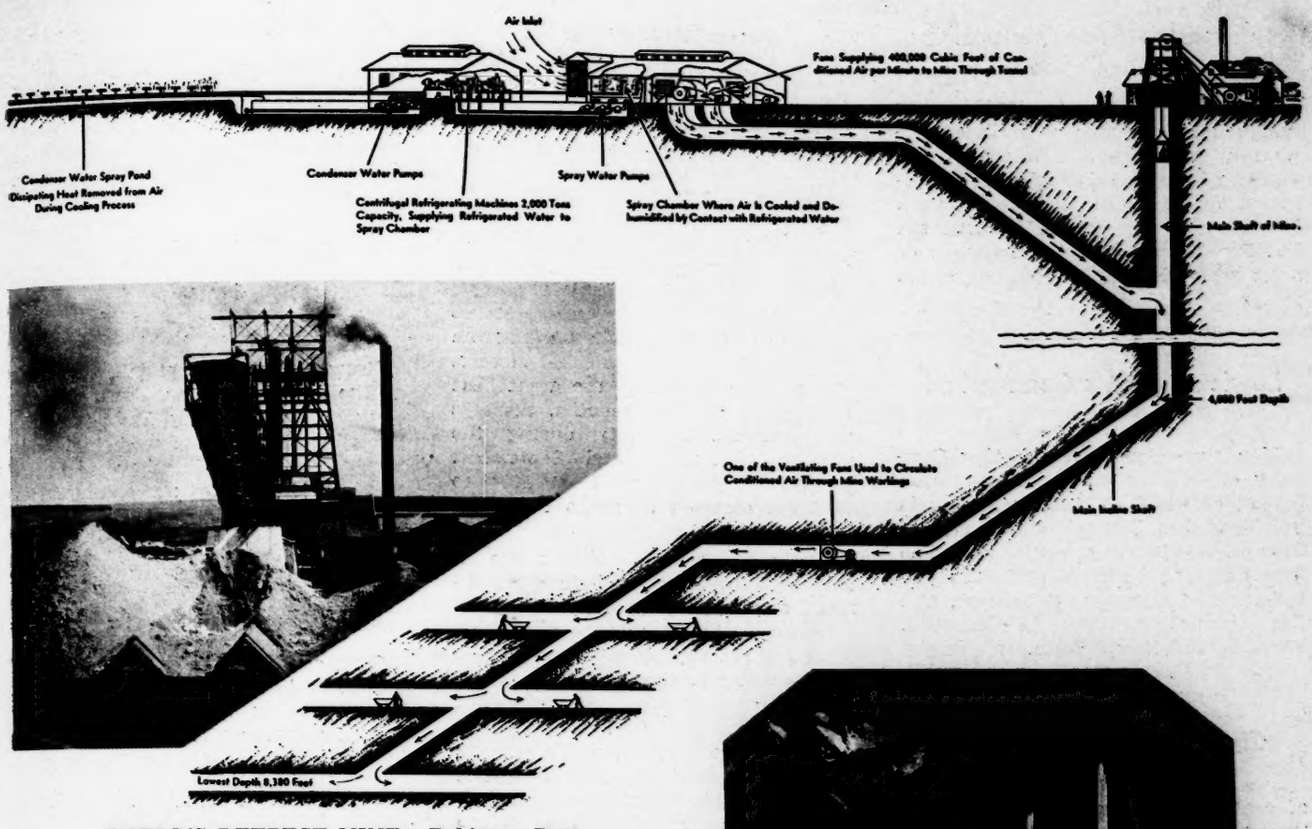


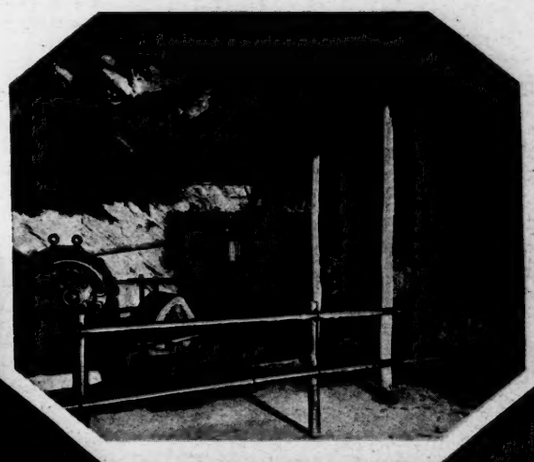
WRIST WATCH REFRIGERATOR invented by members of the Purdue University Physics Department has Miss Maxine Flower, of the University's Health Department, in a comfortable frame of mind. It uses solidified carbon-dioxide (dry ice) to cool the blood stream at the wrist in much the same fashion as cooling the wrists with cold water, which eventually cools the entire body. Story, page 59.

↑ KEWANEE AND KELVINATOR cooperated to build this compact automatic steel boiler-oil burner unit. Weighs 736 lb, supplies 600 ft. of steam radiator. Finished in blue lacquer and trimmed in chromium.

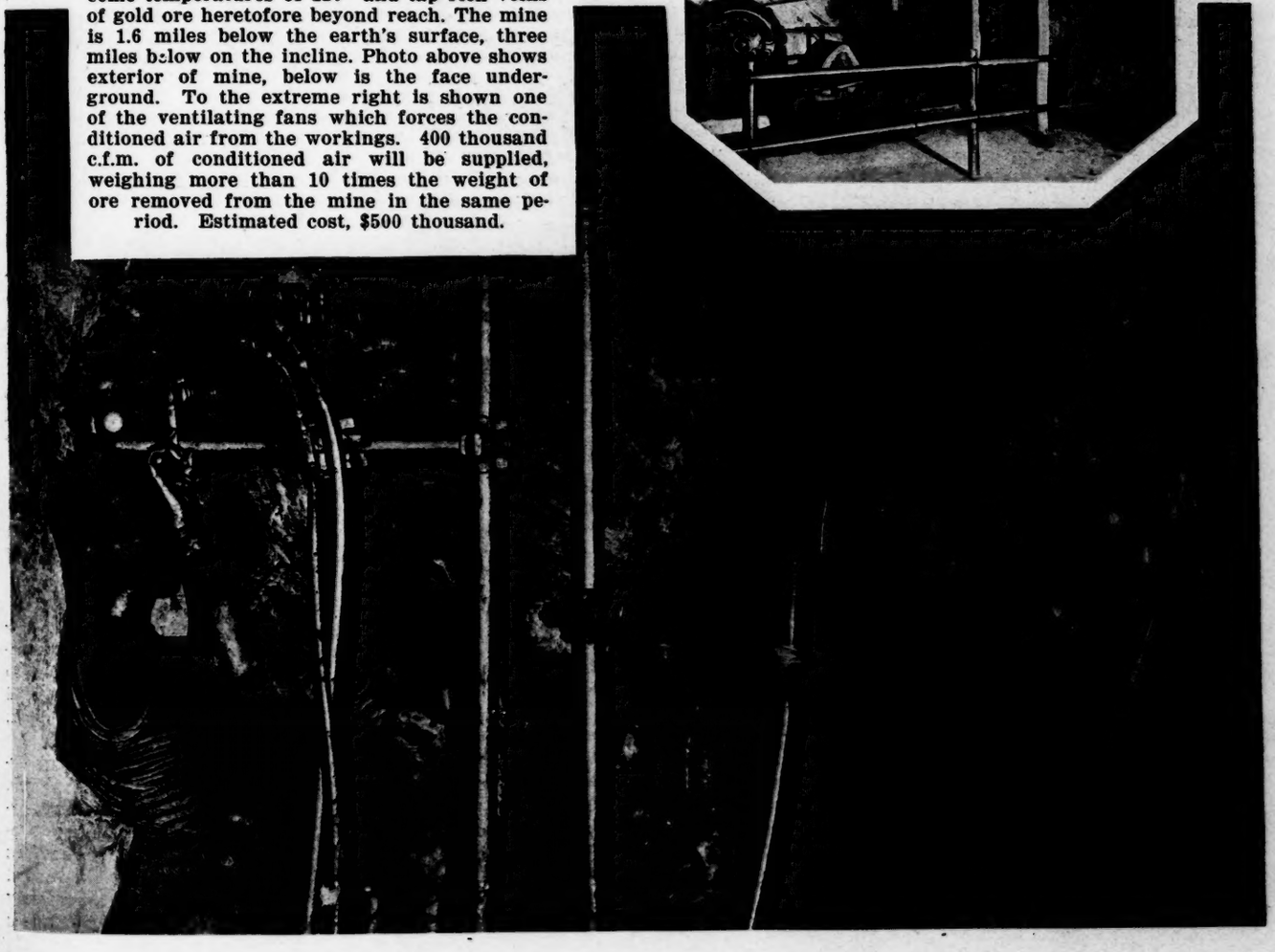
PROF. J. MOSCICKI, PRESIDENT OF POLAND, INVENTS an air cleaning and ionizing device for use in European regions. He is here shown at the right with apparatus in the background. Photo by International News. →

PLANE SPEEDS DELIVERY OF STOKER Carl V Seltzer of Elmer B. Lacey Coal Company, took off from Chicago's Municipal Airport early August 9 with the first new automatic coal burner to be delivered by Fairbanks, Morse & Company to his firm in Endicott, N. Y., for display purposes. He claims by getting the first model before competing dealers receive theirs, ↓ his concern will have a decided sales advantage.


Air Inlet
Fans Supplying 400,000 Cubic Feet of Conditioned Air per Minute to Mine Through Tunnel
Condenser Water Spray Pond Dissipating Heat Removed from Air During Cooling Process
Condenser Water Pumps
Centrifugal Refrigerating Machines 2,000 Tons Capacity, Supplying Refrigerated Water to Spray Chamber
Spray Water Pumps
Spray Chamber Where Air Is Cooled and Dehumidified by Contact with Refrigerated Water
Main Shaft of Mine
4,000 Foot Depth
One of the Ventilating Fans Used to Circulate Conditioned Air Through Mine Workings
Main Incline Shaft
Lowest Depth 8,380 Feet



WORLD'S DEEPEST MINE Robinson Deep in the South African gold fields is being air conditioned by Carrier Corporation to overcome temperatures of 120° and tap rich veins of gold ore heretofore beyond reach. The mine is 1.6 miles below the earth's surface, three miles below on the incline. Photo above shows exterior of mine, below is the face underground. To the extreme right is shown one of the ventilating fans which forces the conditioned air from the workings. 400 thousand c.f.m. of conditioned air will be supplied, weighing more than 10 times the weight of ore removed from the mine in the same period. Estimated cost, $500 thousand.



Redden Joins General Appliance

NEW YORK—Ellis L. Redden has resigned his position with Delco Appliance Corporation to become associated with General Appliance Corporation, distributor in the Metropolitan New York area for Delco-Heat products. Mr. Redden was assistant manager of sales promotion for Delco prior to his resignation.

Lewis Appoints Connecticut Dealer

HARTFORD—Automatic Heating Company of Connecticut, Inc., 10 Clinton Street, of which C. Oakley Baring is president, has been appointed distributor of Lewis air conditioners. The firm has long been active in the distribution of Century oil burners, and has associate dealers in Hartford, Meriden, and New Britain.

Coal Prices Up in Boston

BOSTON—A general increase in prices of coal and coke went into effect in the metropolitan area of this city September 1. Coal prices generally advanced 50 cents a ton, making a total increase of 75 cents since spring, although it does not equal the wholesale increase since spring of $1 a ton. In all cases there is a $1 cash discount, making the net cash prices $13.85, $13.60, and $13.35 per ton, respectively, for egg, furnace, and nut coal. Stove coal is 25 cents per ton more than the lowest above prices, and bituminous and buckwheat have also advanced 25 cents a ton. Coke advanced 45 cents a ton to $12. However, by purchasing at least two tons before September 1 at the previous price of $11.55, customers were guaranteed coke at $11.55 until October 1. Those who made contracts before July 1 at $11.25 can continue to get it at that price until October 1. After that date those holding such contracts may purchase coke at $1 per ton less than the winter price.

Land on Welding Meeting Program

NEW YORK—Dr. S. Lewis Land, of the Heating, Piping and Air Conditioning National Association headquarters, will be one of the speakers at a Symposium on Qualifying Operators of Welding Equipment and Expenses Incurred Therein, to be conducted at the afternoon session, October 4, at the 14th fall meeting of the American Welding Society. The meeting will be held at the Hotel New Yorker here.

Doctor Land will discuss pipe welding.

Tunis is Market for A. C.

TUNIS, TUNISIA—According to U. S. Consul Lawrence S. Armstrong, it is believed that there exists in this city a small but potential market for air conditioning apparatus. The climate of Tunis is semi-tropical with a hot season which lasts from approximately the middle of June until the middle of October. During this period the temperature ranges from about 85° to 120° in the shade, the higher temperatures being reached when the hot wind from the desert, known as the sirocco, blows. In addition to the great heat during the summer months, there is also extreme humidity during the months of August and September. Temperatures ranging from 100° to 110° are common throughout the hot season.

While economic conditions are at present unfavorable and no large demand can be looked for, it is felt that a certain number of small or medium-sized installations might be sold here. There is at present but one air conditioning installation in Tunis, which was put in operation July 18 in a low-priced department store which was opened here recently. This system is of French origin and was manufactured and installed by the Maison Sulzer of Paris. The characteristics of this system are as follows: 100-hp. ammonia compressor; 80,000 litre water tank; 1,350 water sprayers; 28-hp. ventilator, with a capacity of 100 cubic meters per hour.

The fact that there is already one installation operating in Tunis should make easier the sale of further systems as it would not be necessary to sell a thing which the prospective purchaser had never seen. The inauguration of this installation was given wide publicity in the various local newspapers and the store has been visited by large numbers of people.

No large installations could be sold here nor should a large volume of sales of smaller types be expected. The demand would be limited and confined to the following types. Small apparatus for cooling one or two rooms might be of interest to the various government departments and banks for use in the offices of the higher officials. Sales of medium-sized equipment might be made to possibly two or three of the motion picture theaters in the city of Tunis and possibly to a small number of enterprising stores. There are in Tunis two large hotels which close their dining rooms during the summer season owing to the heat and the lack of business and which might be interested in air conditioning apparatus. A few small installations might be sold to some of the wealthier French and Arabs for their homes.

The current produced in the municipal plant of Tunis is 110 a.c. 3 phase, 50 cycle and its cost for power purposes is one franc per kw.-hr.

In the event that there are any American manufacturers of air conditioning equipment maintaining offices or agencies in Europe, it might be of interest to them to have a representative visit Tunis to make a study of local conditions and the feasibility of endeavoring to obtain distribution in this country.

New Officers for Boston A. S. R. E.

BOSTON—At the September meeting of the Boston Section, American Society of Refrigerating Engineers, the following new officers were installed: president, Percy Kingsley; vice-president, C. E. Morrow; secretary-treasurer, Oliver Eckel.

Bevington Represents Perfex

CHICAGO—The Heating Division of Perfex Radiator Co., Milwaukee, Wis., is now being represented here by C. H. Bevington Co., 10 South LaSalle Street.

Bacon Bros. to Handle Lennox

MIDDLETOWN, CONN.—Bacon Brothers, heating contractors, 359 Main Street, have been appointed dealers for the Lennox Aire-Flo air conditioning system and have launched an intensive local advertising campaign.

London at Mock's

NEW YORK—E. A. London, former president and general manager of the United Plumbers Supply Company, is making his headquarters at the office of Charles Mock, Inc., 200 West 101st Street. He invites correspondence from manufacturers, wholesalers, and contractors in the plumbing and heating industries.

Timken Silent Automatic Holds Regional Conventions

DETROIT—The Timken Silent Automatic Company held its annual mid-year regional conventions July 30 to August 6, with one-day meetings held in Baltimore, Philadelphia, New York, Boston, Utica, Detroit, and Chicago.

According to T. A. Crawford, advertising and sales promotion manager, the attendance this year was proportionately larger than that of any previous year, with about 1200 dealers and salesmen attending. This record attendance was attributed primarily to interest shown in the company's

new products, including the air conditioning oil furnace, oil boiler, and the new pressure type oil burner.

An interesting and varied program was offered by company executives and guest speakers, who presented talks covering every phase of the merchandising of oil heating.

Features of the oil furnace were described by L. N. Zimmerman, in charge of oil furnace sales. The recent expansion of the oil boiler line was the subject of a talk presented by K. S. Lindauer, in charge of oil boiler sales. He stated that there is a steadily growing demand for coordinated heating units.

The new pressure type burner was presented by M. J. Roberts, vice-president and general sales manager. Mr. Roberts explained that this burner was introduced to "round out" the line and enable company representatives to fill every demand for automatic oil heating. A description of the oil water heater, which will soon make its debut in the field of oil heating equipment, was also given.

Other executives of the company featured on the program were President Willard Rockwell; F. M. Root, sales manager, dealer division, and T. A. Crawford. Guest speakers were Prof. A. C. Busse, of New York University, and W. B. Henri, president of Henri, Hurst & McDonald, Inc., Chicago.

New Jobber for Boston

BOSTON—A new jobbing house, known as the Metropolitan Pipe and Supply Company, has been formed to serve heating contractors in the metropolitan district. Officers of the new company are W. E. Brown, president, formerly with W. D. Cashin Company, Harry G. Dodge, vice-president, formerly with National Radiator Corporation, and Clement Claflen, treasurer, formerly with Grinnell Company, Inc. Headquarters have been established at 145 Broadway, Cambridge.

A. C. for Beach Restaurant

NEW YORK—A new addition to Jones Beach State Park will be the Central Mall Cafe. It will have a dining room to accommodate 360 persons, a hard maple dance floor, and will be air conditioned throughout.

3 Gar Wood Dealers for N. E.

BOSTON—Three New England distributors for Gar Wood air conditioning equipment have been appointed in New England through Air Conditioners, Inc., the New England factory branch. They are Patterson & Patterson, Springfield, who have been in the oil burner business for 12 years, carrying a complete line as distributors for Hampden, Franklin, and Hampshire counties; R. M. Flagg Co., Bangor, Me., covering northern Maine, and Tantillo & Morgan, heating contractors, with territory covering Quincy, Mass., and the South Shore.

Gar Wood's Boston factory branch, Air Conditioners, Inc., has equipped 44 homes in Belmont, Mass., and is equipping 24 in Lexington, Mass., with Gar Wood air conditioning, the latter group now being under construction.

St. Louis A. C. Plants Cooled by District Refrigeration

ST. LOUIS—Fifteen downtown business houses are being air conditioned by means of systems connected to lines of the St. Louis Refrigerating & Cold Storage Company, which operates a district refrigeration system.

The conditioning installations include a bank, a broker's office, electrical appliance store, two hotel dining rooms, men's wear shop, railroad office, four restaurants, three women's shops, and a foot appliance shop.

Hoffman Appoints Williams in Cincinnati

CINCINNATI—E. C. Williams has been appointed Hoffman Specialty Company representative, with headquarters at Hotel Broadway. Mr. Williams was formerly on the Hoffman sales force in New England.

G. E. Distributor Holds Meeting

BOSTON—The progress in two years of merchandising the G E. oil furnace and plans for the development of this and air conditioning business in the immediate future were the subjects discussed at the monthly meeting of Lawton Engineering Corporation, eastern New England distributors of G.E. automatic heating and air conditioning equipment.

Otto Lawton, president of Lawton Company, welcomed those present. Henry C. Mayo, general manager of Lawton, spoke of the unusual success that has been the experience of the company since its inception in 1932. William Scheriff, in charge of the oil furnace merchandising of G.E., told of the advertising plans and the autumn sales campaign.

E. J. Opal, merchandising manager of the air conditioning department of G.E., talked of the factory policies with regard to the coming season. Ralph Merica, recently appointed New England sales representative of the air conditioning department, was introduced.

Vilter Plant for Henrici's

CHICAGO—A Vilter air conditioning system has been installed in Henrici's Restaurant. The plant, reported to have cost $20 thousand, cools the first and second floors.

Candy and Drug Stores Conditioned

CHICAGO—Mrs. Ora Snyder has announced that she will modernize all her candy stores by air conditioning them. The reactions of World's Fair visitors to her shop at the west end of the Swift bridge were such as to bring about this decision. Three stores are already under contract or in the process of having conditioning installed. Three other stores were conditioned last year.

Illinois Liggett's Drug Company, which has signed a lease for the corner space in the American National Bank Building at the southeast corner of La Salle and Washington Streets, will air condition the store. In the same building the quarters of the American National Bank and Trust Company on the second to fifth floors, inclusive, have already been air conditioned. This is the second bank on La Salle Street to have temperature control the year round, the Northern Trust Company being the pioneer.

"Creative Design" Announced

NEW YORK—A new publication, Creative Design, will be directed to the home furnishing trade, and will deal with new and outstanding developments in modern design. The publication will be issued quarterly.

A. C. Building for WGN

CHICAGO—The Chicago Tribune has ordered steel for a half million dollar broadcasting studio building for WGN where all its radio activities will be centered. The structure, of Bedford stone, will be located just north of the present Tribune Tower. It will be three stories high with an ultimate height of 24 stories.

The station will be air conditioned throughout. Chilled water for dehumidification and cooling will be tapped from the present 600-ton steam jet refrigerator in the basement of the Tribune Tower. This unit was installed large enough to take care of the annex just announced.

A. C. for Soap Plant

BOSTON—General Heat & Appliance Corporation, distributor of Frigidaire air conditioning equipment, has installed a one-ton compressor and suspended unit in a laboratory of the Lever Brothers factory at Cambridge. This concern manufactures soap.

Arvedon Markets Boiler-Burner

BOSTON—A new house-heating unit has been developed by Arvedon Bros. of Boston, which will be marketed as the "Boiler-Burner by Arvedon." It consists of a Fitzgibbons steel tubular marine type boiler with a Silent Glow oil burner. It will be marketed through the Arvedon Bros. chain of equipment stores and plants in Boston, Lynn, and Worcester, Mass.

A. C. for Kansas City Auditorium

KANSAS CITY—The U. S. Engineering Company, heating, ventilating, and refrigeration contractors, reports an air conditioning installation embodying the Auditorium principle in the new municipal auditorium now under construction, and designed to accommodate the largest conventions and exhibitions. W. L. Cassell is the engineer.

C. & N. W. Conditions Ticket Office

CHICAGO—The new city ticket office of the Chicago & North Western Railway, recently opened at 148 South Clark Street, is completely air conditioned.

New York Store, Bank, and Theater Conditioned

NEW YORK—A 100-ton steam jet refrigeration plant for air conditioning is being installed in the Continental Bank here. Surface coolers located within the main distributing ducts will condition the air. The system will cost about $75 thousand.

A $40 thousand conditioning system has been completed in the Bellaire Theater, Bellaire, Long Island. A surface cooling and dehumidifying arrangement which uses well water was installed. The water is drawn from a deep artesian well and after use it is pumped to a second "disposal" well.

General offices of L. W. & P. Armstrong, 99 Wall Street, have been air conditioned using unit type equipment.

May's Department Store, Fulton St., Brooklyn, has installed an air conditioning system reported to have cost over $30 thousand.

Trupar Assets Purchased

DETROIT—Winslow-Baker-Meyering Corporation has acquired the assets of Trupar Manufacturing Company of Detroit, manufacturers of Mayflower refrigeration and air conditioning equipment.

Other subsidiaries of Winslow-Baker-Meyering in the refrigeration field include Copeland and Zerozone.

College and Utility Install Oil Systems

BOSTON—Massachusetts Heating Corporation, Ray distributor, has installed oil-burning installations using heavy fuel in the headquarters building of the New England Telephone and Telegraph Company and in a group of faculty buildings at Wellesley College. In both of the installations coal was replaced.

Hugo Rehling, formerly with B. F. Sturtevant Company, has joined the Massachusetts Heating Corporation as associate engineer.

Heating Estimates Guaranteed by Gas Company

BIRMINGHAM, ALA.—The Birmingham Gas Company, operating in a field where competition is keen, is crashing the house-heating market by offering to guarantee the amount of the fuel bill for the first heating season. Under this plan the company makes an estimate of the heating bill with each conversion burner installed. If the actual cost runs more than 10% above this estimate, then the utility agrees to take out the burner and restore the heating system formerly in use. This gets around the fear that gas heating is "too high."

The company also installs burners on rental basis, payments to apply on the purchase at the discretion of the homeowner.

Denver Gas Rates May Be Cut; Stoker Competition Alarms Utilities

DENVER—The Public Service Company of Colorado, a Cities Service subsidiary, has filed a petition with the Denver city council seeking permission to reduce rates between 10 and 15% on consumption of over 3,000 cu. ft. per month.

Three considerations motivated the company in seeking the reduction: first, public pressure, fomented by local news organs basing their attack on lower rates elsewhere; second, competition from other heating methods, especially automatic coal stokers, and third, an independent move to increase the consumption of gas in domestic heating plants and appliances.

The reduction would benefit approximately 20,000 out of a total of 65,000 consumers, it is estimated. If the new scale is accepted the company is planning to launch an extensive drive, including a house-to-house canvass, and expects to obtain between 1,000 and 2,000 new domestic heating customers.

In the 57,000 residences in the Denver district, which includes the nearby towns Edgewater, Arvada, Aurora, Englewood, Littleton, and Golden, domestic heating methods are divided as follows:

Eight to nine thousand, or more than 14%, gas; 1,200 to 1,500, oil; 1,500, automatic coal stokers; the remainder hand-fired coal or no central heating plant at all.

Starting with 400 customers, consisting only of those who could afford to pay high rates for the added convenience of gas, in 1928, when natural gas was substituted for manufactured gas, the Public Service company reached a peak of 10,000 customers in 1932, using gas for domestic heating.

Thus far replacement of gas heating by other methods has been negligible, most of the reduction since 1932 resulting from houses being vacated. Automatic coal heating has gained a real foothold in the heating of buildings and apartments in the last year, however, and is beginning to invade the domestic heating field in earnest.

The present gas rate schedule is: 90 cents flat rate for the first 400 ft.; 15 cents per 100 for the next 600; 12 cents per 100 for the next 1,000; 7½ cents per 100 for the next 1,000, bringing the charge for the first 3,000 ft. to $3.75. Above that the rate is: 6 cents per 100 for the next 7,000; 5 cents per 100 for the next 10,000.

Oil Burner Code in a Tangle

(Concluded from page 54)

Spokesmen for consumers refer to the first of these arguments as "puerile."

Industrial Burners—Last May makers of industrial burners, through their spokesman, Edward P. Bailey of National Airoil, asked to be exempted from the Oil Burner Code and set up their own code.[8]

Such a code (Industrial Oil Burning Equipment Manufacturing Industry) was approved July 30, went into effect August 9. Features: 40-hr. minimum week, with provisions that for six weeks in any six months period employes may work 48 hr. per week with time-and-half pay; provides for Code Authority of five, elected by majority vote of industry; willful price cutting is unfair trade practice; exempts industry from Oil Burner Code.

[8]Mr. Bailey had urged this point as early as October 16, 1933. Reasons: Industrial burners are not made in mass production, not sold, distributed or installed by same methods or through same channels as house-heating units. Only similarity, he claimed, was that both house-heating and industrial burners use the same fuel.

Sears Sells 10,000 Oil Burners

PHILADELPHIA—A recent announcement of Sears, Roebuck & Company stated that more than 10,000 oil burners were sold last year by that company. This means that approximately 14% of the total oil burner sales were made by this company. Total oil burner sales for 1933 were 71,600 units.

Roy Heads G. E. Advertising

NEW YORK—A. C. Roy has been appointed manager of the advertising division of the air conditioning department, General Electric Company, succeeding W. A. Bowe, resigned.

Mr. Roy entered the employ of the Edison Lamp Works of the General Electric Company in 1916. In 1932 Mr. Roy was transferred to the air conditioning department, handling merchandise promotion, dealer meetings, sales campaigns, and sales training.

Gerald John O'Connor

BROOKLYN, N. Y.—G. J. O'Connor, who for the past 28 years had supplied HEATING AND VENTILATING with the data on which the monthly weather charts were based, thereby contributing to nearly 250 issues of this publication, died here August 20 after a short illness. He was 67 years of age.

Mr. O'Connor, who was connected with the New York Weather Bureau, is survived by his widow, a son, and a daughter.

George W. Christoph, Sr.

HARTFORD—George W. Christoph, Sr., 70, founder and president of the Sterling Blower Company, and its affiliate, the Hartford Blower Company, died August 20 after a long illness.

Mr. Christoph was born at Reading, Pa., in 1863, and came to Hartford at the age of 30, when he founded the Sterling company, which ever since has been engaged in the manufacture of ventilating equipment and exhaust systems.

Mr. Christoph is survived by his wife, two sons, three sisters, and two grandchildren.

Raymond Mathewson Hood

NEW YORK—Raymond M. Hood, designer of the American Radiator Building, Daily News Building, Beaux Arts Apartments, McGraw-Hill Building in New York, and the *Chicago Tribune* Tower, died of arthritis August 14 at the age of 53.

Mr. Hood, who assisted in designing the Century of Progress buildings and Radio City, is survived by his widow, two sons, and a daughter.

The late L. H. Van Ness

L. H. Van Ness

BON SECCOUR, ALA.—L. H. Van Ness, widely known as one of the organizers and one time director of the American Oil Burner Association, died here July 23 while working in his garden.

From 1902-1920 Mr. Van Ness was connected with Manning-Maxwell-Moore. At the time he left this company he was Chicago manager for its Brass Goods Division.

In 1920 he started the Federal Gauge Company, which a few years later formed The Mercoid Corporation.

He was born 50 years ago in Charlotte Co., Va.

J. K. MacCarthy

RALEIGH, N. C.—J. K. MacCarthy, since 1928 a district manager for Kelvinator Corporation, died suddenly at his home here August 14. He was 37 years old. Mr. MacCarthy is survived by his wife, a daughter, and his parents.

COMING EVENTS

SEPTEMBER 19-29, 1934. *Second Annual National Electrical and Radio Exposition, Madison Square Garden, New York.*

OCTOBER 29-NOVEMBER 2, 1934. *Sixteenth Annual Convention and Exposition of the American Gas Association, Atlantic City Auditorium, Atlantic City, N. J.*

DECEMBER 3-7, 1934. *Fifty-fifth Annual Meeting of the American Society of Mechanical Engineers, New York, N. Y.*

DECEMBER 3-8, 1934. *Eleventh National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.*

August Data Sheet

EDITOR, HEATING AND VENTILATING:

As I have been following the combustion data included on the blue page of HEATING AND VENTILATING with considerable interest, I felt sure that you would be interested in learning of several inaccuracies which were contained in the August issue.

The standards of sizing for anthracite as shown were replaced on April 1, 1931, with new standards, which are considerably different. These new standards were accepted by the Anthracite Institute and have been in use for the past three years by the entire industry. We therefore feel that any attempts to use the sizings as contained in your article will lead to a considerable amount of confusion.

We also wish to call your attention to the fact that the analyses of anthracite as published are at a considerable variance with extensive analyses which have been made during the past several years. For example, one investigation sponsored by the Anthracite Institute in connection with the Bureau of Mines reported that an average B.t.u. value for 204 samples in all parts of the anthracite field was 13,235, with a corresponding ash content of 11.2%.

We wish particularly to call your attention to the fact that the lowest B.t.u.'s secured in any one field was 12,648, which is some 1600 B.t.u.'s higher than the 11,081 which you show for the Wilkes-Barre district. Similarly, the highest percentage of ash in any one field was 13%, as compared with 16% as shown in your table.

It is very easy for us to understand these discrepancies, since the standards of anthracite preparation have improved materially during the past few years, and have rendered most of the data which are available on the subject obsolete. However, we are naturally anxious to receive credit for this improved preparation, and feel that 13% ash and 12,650 B.t.u.'s may be considered to be a very fair minimum condition of preparation. The following table gives a complete analyses of these 204 samples:

Average B.t.u. per lb.	13,235
Average per cent ash	11.2
Average per cent fixed carbon	83.7
Average per cent volatile	5.1

As it is our desire to be of constructive value to you rather than to be unduly critical of your very excellent magazine, I will certainly be glad to furnish any information or material which we have, and would welcome an opportunity to cooperate more closely with you in the future.

ALLEN J. JOHNSON, Director.
Primos, Delaware Co., Pa.

Data will be revised in an early reprinting of H. & V.'s Reference Data 37 and 38—Editor.

NEW EQUIPMENT

A-C-M-E Boiler Water Treatment

Aquatic Chemical and Metallurgical Engineers, 118 East 28th St., New York, specialists in water treatment in the marine and power plant field, have developed and completed arrangements for national distribution of liquid boiler water treatments for heating boilers. Known as A-C-M-E house boiler cleaners, the liquids have two purposes—as a treatment for correcting priming and foaming conditions, and second, as a pitting and corrosion preventive. The composition of the treatment is modified depending on the waters in the locality where it is to be used.

The treatments are available in three types, one for cast-iron steam boilers, oil or gas fired; another for steel, oil or coal-fired steam boilers, and a third for gas-fired steam boilers and all types of hot water heating.

In the case of cast-iron steam boilers two cans are used for every 6 sq. ft. of grate area. One can is poured into the boiler through the safety valve opening, and allowed to remain there under *normal* steaming for two or three days. Then the boiler is emptied under not less than 10 lb. pressure through the bottom drain pipe and the boiler refilled with clean water. Later the second cleaning is given with the second can. For steel and gas-fired boilers there are other directions.

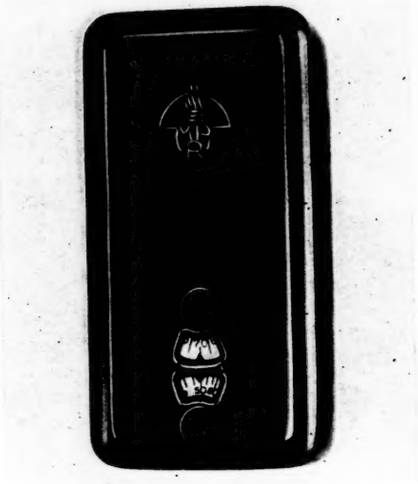
The treatments are available to jobbers and contractors throughout the country in small or large lots. Further information regarding the treatments or special water treatment on heating boilers can be obtained from the firm.

Minneapolis Humidity and Temperature Control

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., has announced a temperature and humidity control. It is housed in a case 6 × 3½ × 2½ in.

In the thermostat part of the control, the bi-metallic actuating element tips a mercury switch, thus making or breaking the circuit as required to turn heat on or off. It can be used on either low or line voltage circuits and operates on a temperature change of less than 1° above or below the setting.

The actuating element of the humidity control is human hair. This element also tips a mercury switch capable of handling either low or line voltage current. This instrument will control to within 2% relative humidity under normal rate of change in relative humidity.



Minneapolis humidity and temperature control

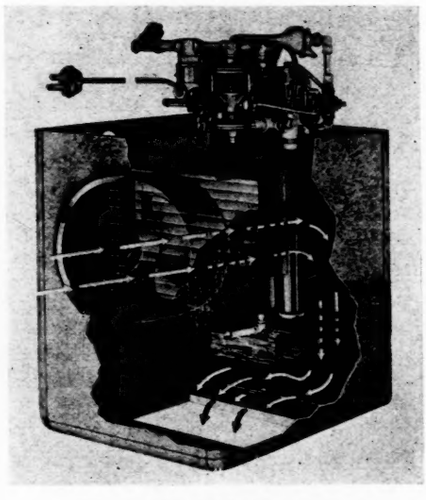
The settings for temperature and humidity are made with the small knurled knobs on the front of the instrument. The temperature range is from 60° to 80°, humidity setting from 20% to 80% relative humidity, and the instrument is available either with or without the humidity indicator scale.

Bryant Humidifier Air Conditioning Unit

The Bryant Heater Co., Cleveland, at its sales convention, announced and exhibited a humidifier and heating unit designed to make winter humidifying practical at reasonable cost in any home enjoying gas service.

The unit is designed to be hung from basement rafters, with a distributing duct leading to an outlet grille on the floor above. It consists, essentially, of a fan blower; a removable screen filter which is constantly washed by warm water; a gas-burning heater with a surrounding air chamber and necessary controls. The cabinet is delivered complete ready for installation and connection to gas and water lines and the distributing outlet.

Capacity of the unit is ample for supplying proper humidity to most residences. The unit is low in price and in installation cost.



Bryant humidifier-heater

Mellow-Aire Furnace

Liberty Foundry Co., St. Louis, has announced two warm-air furnace conditioning units. One, the Mellow-Aire, is a cast-iron furnace with round or square casing, blower, filter, humidifier, and controls. It is available in five sizes, from 72,000 to 162,000 B.t.u. per hr.

The other is the Front Rank, which is available in nine sizes from 90,000 to 450,000 B.t.u. per hr. This unit includes the same conditioning equipment but consists of a steel furnace in round or square casing.

Neon Light Indicates Blown Fuse

L. S. Brach Manufacturing Co., 80 Duryea St., Newark, N. J., has placed on the market a porcelain plug and cartridge cutout with Neon lamp indicators. When a fuse blows, the Neon lamp glows, quickly identifying the blown fuse. The light is extinguished as soon as a new fuse is inserted. It is not affected by short circuits or current surges.

Dail Furnaces

Dail Steel Products Co., Lansing, Mich., has announced two new oil-burning furnaces.

The Series 0-100 oil-burning furnace is designed for the small home and can be converted into a coal-burning plant if desired. Designed as a competitive unit, it is built in one size with a capacity of 652 sq. in. of pipe area.

The Series 0-200 furnace includes the company's double radiator system with vertical flues, and with grate supports so that the plant can be converted to burning coal if desired. It is built in two sizes, one having an output of 205,000 B.t.u. per hr. when operating as a gravity system and burning 2¼ gal. of oil per hr. The larger size has an output of 273,000 B.t.u. per hr., burning 3 gal. of oil per hr. and operating as a gravity system.

Columbus Air Conditioner

The Columbus Humidifier Co., 154 N. Fifth St., Columbus, Ohio, has announced a winter air conditioner. The unit humidifies the air, cleans it with glass filters, and circulates the air.

The unit is mounted on a one-piece cast-iron base with the fan housing spot welded to the base. The centrifugal fan is of the forward curved type, driven through a V belt by a repulsion induction motor. A capacitor type motor can be furnished if desired.

The humidifier is a porcelain enamelled evaporator pan with a gas burner controlled by a safety pilot. Four filter units are included. Finish is of baked enamel with crackle finish, the inside being covered with plastic sound deadening material. The unit is designed to be used with warm-air furnaces.

Redflash De Luxe Boiler

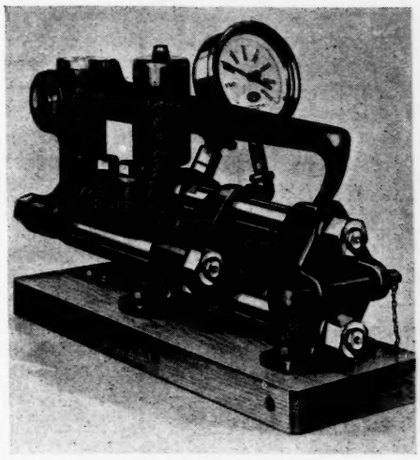
To provide heating equipment of a finished appearance, American Radiator Co., 40 West 40th St., New York, has placed on the market the Ideal Redflash De Luxe boiler. The unit is enclosed entirely in an enameled steel, insulated cabinet, with all doors and accessories hidden.

The cabinet is finished in red with chromium fittings. In it there is a standard No. 1 Ideal Redflash boiler. Space for an indirect water heater and for the smoke is also provided within the cabinet. Special grilles, with a shutter arrangement, in the front panel door of the cabinet are provided to emit heat to the basement as desired.

Portable Weld Tester

The growing demand for accurate knowledge of weld strength and the delay and complexity of shipping weld specimens to testing laboratories have brought about a demand for a compact, accurate, and portable testing machine for use on the job. To meet this, Air Reduction Sales Co., Lincoln Building, New York, has developed the Airco portable tensile and bend testing machine, a compact, comparatively light machine that can be carried to the welding job so that welded specimens can be tested on the spot. The entire unit weighs only 200 lb.

The machine consists essentially of an oil pump, a hydraulically-actuated piston or ram, two heads—one fixed and one movable—for gripping the test specimens, and four symmetrically located steel shafts, two of which transmit the piston motion and load to the movable head. The other two shafts maintain the alignment of the two heads, and prevent the introduction of bending stresses in the tensile test specimen.



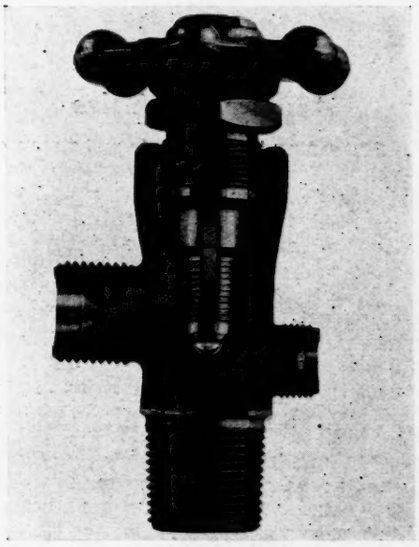
Airco weld tester

By means of a long lever attached to the pump, and the ratio between the areas of pump plunger and hydraulic ram, the downward force on the pump lever is magnified 400 times in the load applied to the test specimen. This magnification of the force applied to the pump lever, together with the large piston displacement of the oil pump, enables specimens to be tested rapidly and with a minimum of effort.

The load on the test specimen is indicated on a 6-in. pressure gauge of special construction, carefully calibrated against a standard dead weight tester. The gauge is designed to maintain its accuracy under the strains of usage and shipping.

Airco Oxygen Cylinders with Ball-Seat Valves

Air Reduction Sales Co., New York, has equipped more than 96% of all of its oxygen cylinders with valves having a stainless steel ball seat.



Airco ball-seat valve

While the valve proper closely resembles the older type valve in appearance, it differs in construction in that a hardened stainless steel ball forms the seat.

The valves not only open and close easily but they are said also to possess superior sealing qualities.

Steam Pressure Boosters

Worthington Pump and Machinery Corp., Harrison, N. J., is marketing a line of steam booster compressors. When high pressure and high temperature steam is required that an existing boiler installation cannot supply, the compressor is used to boost the pressure.

They are available for either steam or motor driven with a multi-V-drive. The compressor cylinder is of semi-steel and the walls are of sufficient thickness to permit two reborings. Cylinder and heads have a heavy covering of magnesia and planished steel lagging. The company's patented feather valves are used for both inlet and discharge.

Kelvinator-Kewanee Boiler-Burner

An oil burner-steel boiler unit has been announced by Kelvinator Corp., Detroit, working in collaboration with Kewanee Boiler Corporation. The unit, it is reported, will retail at an unusually low price.

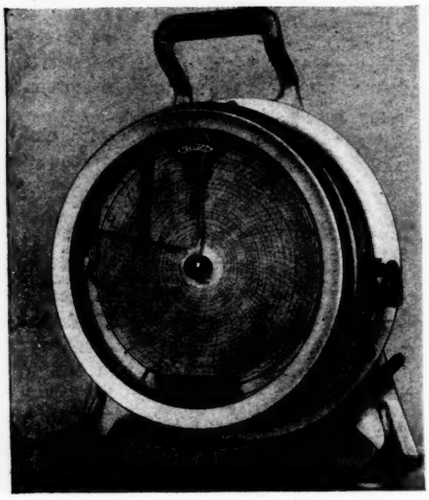
With a capacity of 420 to 600 sq. ft. of steam radiator, the unit, which will be known as the Model KB1, weighs 736 lb. complete, and has the following over-all dimensions, in inches: height, 42 3/4; length of jacket, 46; length including burner and smoke hood, 61; width, 20 1/2.

The boiler is of welded steel construction. Capacity per pound of weight is claimed to have been increased to such an extent that a decrease in size accompanies an increase in efficiency. The burner is of the high-pressure, atomizing type, and is located at the rear of the heater immediately below the smoke hood. The unit is operated by a 1/8 hp. 60-cycle motor, 110 volt a.c. Ignition is of the continuous electric spark type.

The exterior of the boiler-burner is finished in blue lacquer and trimmed with polished chromium plating.

Among the features of the boiler are spiral baffles, single-pass tube bank, and cylindrical combustion chamber.

Features in the unit's automatic burner include a self-priming, nonpulsating pump, an ignition transformer which provides a large, intensely hot spark, an adjustable air shutter, and an air turbulator, located inside the air supply tube.



Portable recording thermometer

Foxboro Portable Thermometer

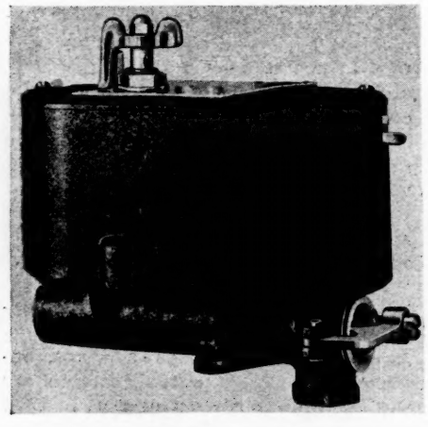
The Foxboro Co., Foxboro, Mass., has developed a portable recording thermometer, light weight and easy removal of the charts being the features.

The device is furnished with either self-contained or long distance thermometer in 8 in. or 10 in. case sizes. The illustration shows an 8 in. type with a range of — 25 to + 125°.

Finish is in soft, frosted silver or dull black lacquer.

Detroit Lubricator Nozzles and Safety Float

Detroit Lubricator Co., Detroit, has announced a line of pressure atomizing nozzles for use on water or oil. Primarily designed for oil burner use they are available in two different types, CRC-286 and CRC-285. Firing discs are of super hard metal, either of nitralloy or stainless steel. Available in a range of sizes.



Detroit fuel oil safety float

The manufacturer has also placed on the market a safety float to eliminate variations in fuel delivery due to differences in head pressures between that of a full or empty tank. The valve is installed in the gravity fuel line between the supply tank and the metering valve. The safety trip mechanism is practically the same as has previously been employed in the company's safety float valve except that instead of oil overflowing into an external open trip bucket, in this case it overflows into an enclosed chamber. Oil rising in this chamber exerts force on an auxiliary float which rises, and through leverage releases the main safety trip lever. The weight of the trip lever, plus the additional force exerted by the spring, is said to insure positive cut-off.

Westinghouse Condensing Units

Westinghouse Electric & Manufacturing Co., Pittsburgh, has announced two new large capacity open-type condensing units. The models are units using freon for the refrigerant and having several other features. Use of an oil pump, oil separator, valves in the head, directed flow of air over the compressor, and a compressor with small bore and stroke permit high-speed of operation with balanced parts and less vibration of the condensing unit.

The units are entirely hooded for protection and to provide a definite air path through the condenser and to efficiently remove the generated heat. The two-cylinder compressor is equipped with a positive oil separator attached to the cylinder head on the suction line, and heavy sealed-in glass windows on each side of the crank case permits visual inspection of the oil level.

Arco Favorite Valve

Extending its line of air and vacuum valves for radiators, American Radiator Co., New York, has placed on the market a popular priced air valve for use on low-pressure steam radiators.

Known as the Favorite valve, it is of all-metal construction with a thermostatic float and siphon, and has a nickel case. It is furnished in four models, the number 525 with an angle connection, and three straight shank models.

The number 526 has ⅛ in., straight shank connection, the number 527 has a ¼ in. straight shank connection, and the number 528 has a ⅜ in. straight shank female thread and a ¾ in. straight shank male thread.

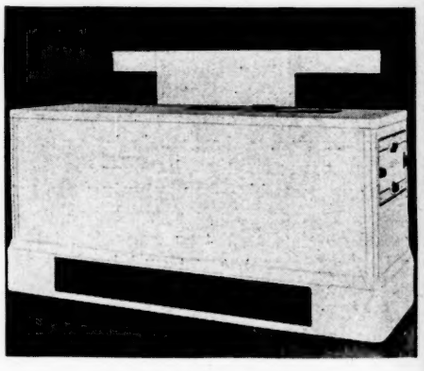
Frigidaire room a.c. unit

Frigidaire Room A.C. Units for $340

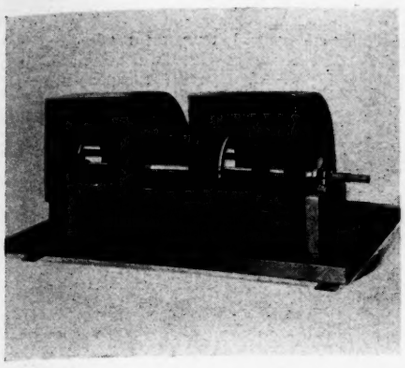
Frigidaire Corp., Dayton, has introduced three self-contained conditioning units. The smallest of the series is a cabinet-type unit with ⅜ ton of refrigeration capacity per 24 hr. and is suitable for the average office or residence room. The unit provides cooling, dehumidification, circulation, and cleaning of the air. Price of this unit is $340, f.o.b., Dayton, installation charges extra.

The second model is of similar design but with ¾-ton refrigeration capacity per 24 hr. This unit has the same functions as the other. Price of this unit is $495.

The third unit has 2/3 ton of refrigeration capacity that functions the year round, cooling, dehumidifying, cleaning, and circulating in the summer time, heating, humidifying, cleansing, and circulating the air in the winter time. This unit has facilities for bringing in outside air and is completely equipped with filters. The unit connects with the regular steam heating system. This unit sells for $583.



Year-round a.c. unit



Drip-Pan mounting for Buffalo fans

Base for Buffalo HVA Fans

With the increasing use of heating and cooling coils and filters, engineers have required a practical method of combining the various units on a standard inexpensive base. This need has been met by Buffalo Forge Co., Buffalo, N. Y., with the new Drip-Pan mounting for Type HVA fans. This drip-pan base is substantial, constructed of sheet metal, heavy enough to be rigid, welded at seams, and leakproof. Pan is large enough to catch dripping condensation. Drain connection is provided.

Clips are provided for attaching a casing around the coil or filter and enclosing the fan inlet. This casing can be made of sheet metal or insulating board. Where extremely quiet operation is desirable the entire unit—pan. fans. coils and casing—can be mounted on floating rubber insulators, which isolate the unit from building foundations.

It is recommended when surface cooling coils are used that pan and fan housings should be dipped in black asphaltum paint to prevent rusting. Brass wheels are also desirable for this service.

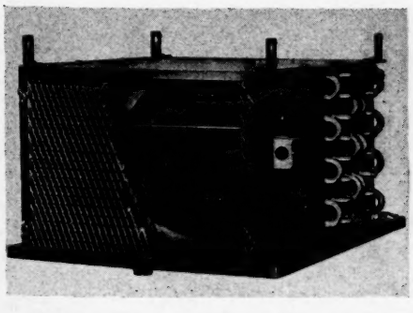
The fans with drip-pans are made in eight sizes, all for stock shipment.

Young Chilling Unit and Extended Surface

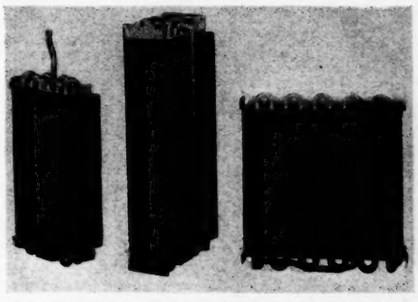
Young Radiator Co, Racine, Wis., has developed a new extended surface of patented type for condensers, evaporators, and other heat transfer surfaces. The illustration shows three types, all having different tube diameters, fin spacing, and construction. The joining is by silver-soldering, soft-soldering, and brazing, depending on service requirements. Aluminum fins can be used where specified and where weight is a primary consideration.

The heat exchange coils are available in a wide variety of tube diameters, fin spacings, and construction.

The company has also placed on the market the Type XBC chilling unit which is mounted on a heavy stamped frame with electric welded corners and furnished with drip pan and heavy support end plates. The fan shroud and guard are easily removable. Tapped hole is provided for draining condensate and the motor is of the ball-bearing type with simple mounting facilities.



Young Type XBC chilling unit



Young heat exchange coils

Sarco Temperature Regulators

Sarco Co., Inc., 183 Madison Ave., New York, has added two instruments to its line.

Type KN-15 is intended for the control of brine cooling coils. In this model, the temperature-sensitive bulb is rigidly attached to the valve. The customary flexible connecting tubing is omitted.

Type TR-20 is a new junior model of the Sarco tank regulator. It is made in three sizes, ⅜, ½, and ¾ in. It has a small bulb, fitted with union connection and is furnished with a short length of flexible connecting tubing.

This regulator was designed to make possible the use of automatic temperature control on equipment for which the standard regulator was too costly.

Fedders Unit Heater

Announcement of the Series 3 line of unit heaters has been made by Fedders Manufacturing Co., Inc., Buffalo, N. Y. The company claims that improvements have been made in design to meet requirements for quietness and appearance.

Fedders unit heater

The cabinets are finished in a dark brown morocco-like casing said to be durable and resistant to abrasion. They are electrically welded in one piece with integral reinforcing.

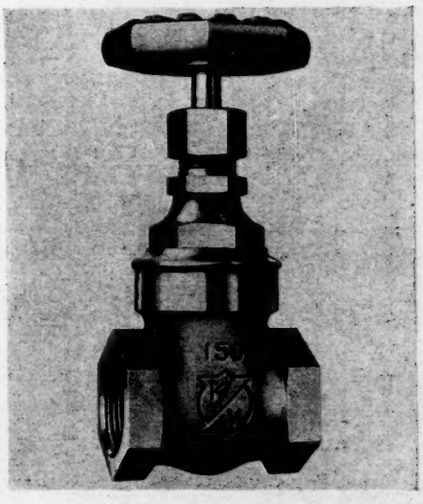
Streamline tubes, patented fins, and resilient motor mountings are said to eliminate noise and isolate vibration.

Capacities up to 1200 sq. ft. E.D.R. steam.

Kennedy Fig. 23 Valve

The Kennedy Valve Mfg. Co., Elmira, N. Y., has placed on the market a new heavy standard bronze gate valve designed for 150 lb. working steam pressure and 250 lb. working water, oil or gas pressure. This valve, known as Fig. 23, has all the special features of design which were recently incorporated in the Fig. 27 standard bronze gate valve but is heavier throughout.

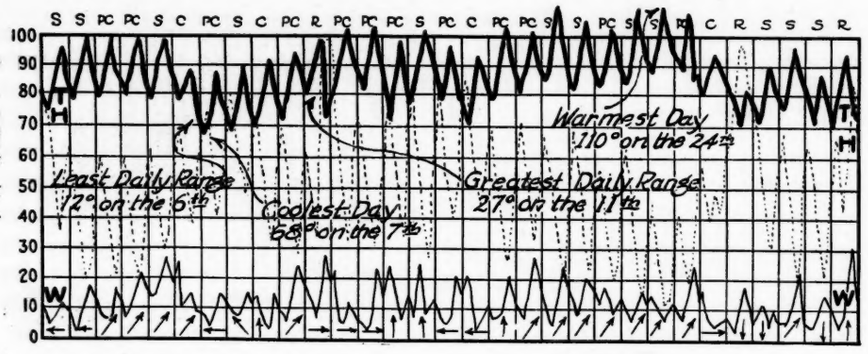
One of the features of these valves is the large bonnet hex which is placed close to the body to make the entire valve more rigid and also to assist easier removal of the bonnet and stem assembly when the valve is installed with close clearances.



Kennedy Fig. 23 valve

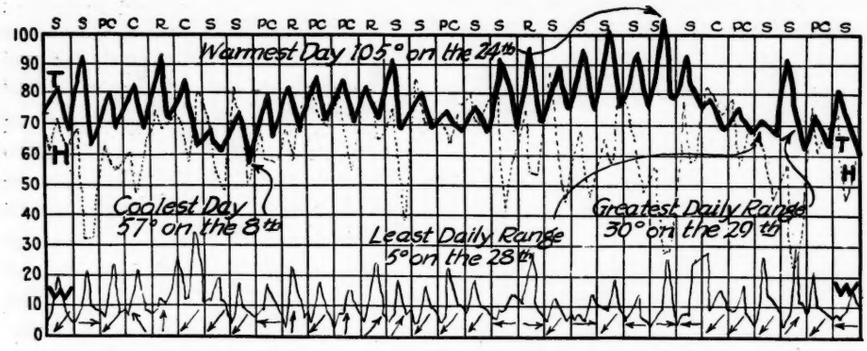
THE WEATHER FOR JULY, 1934

Plotted from records especially compiled for HEATING AND VENTILATING by the U. S. Weather Bureau. Heavy curves (T), temperatures in deg. F.; dotted lines (H), per cent relative humidity, from readings at 8 a.m.. noon, and 8 p.m., except for New York, which shows hourly readings. Light lines (W), wind velocity in m.p.h. Arrows indicate prevailing wind directions. S—clear; PC—partly cloudy; C—cloudy; R—rain; Sn—snow.



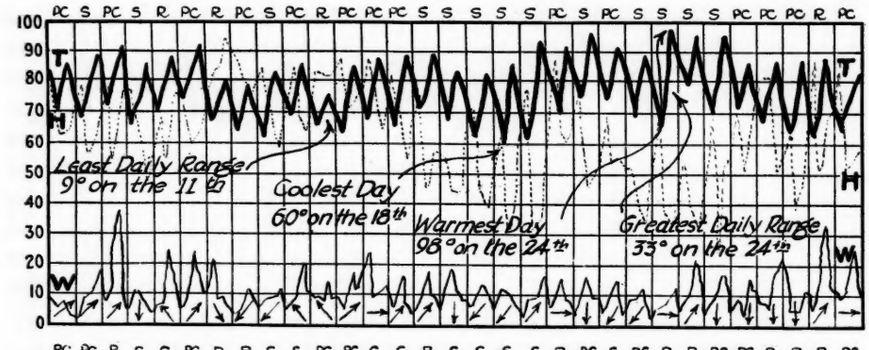
St. Louis

Mean temp. for month 87.2°; aver. wind velocity, 10.7 m.p.h.; prevailing direction of wind, S.W.



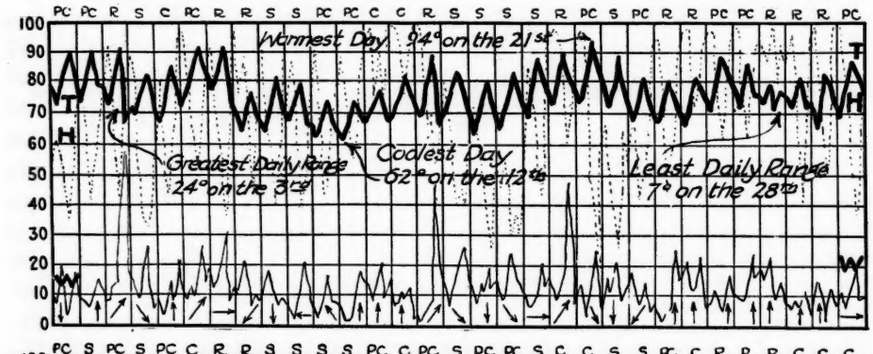
Chicago

Mean temp. for month, 76.6°; aver. wind velocity, 8.4 m.p.h.; prevailing direction of wind, N.E.



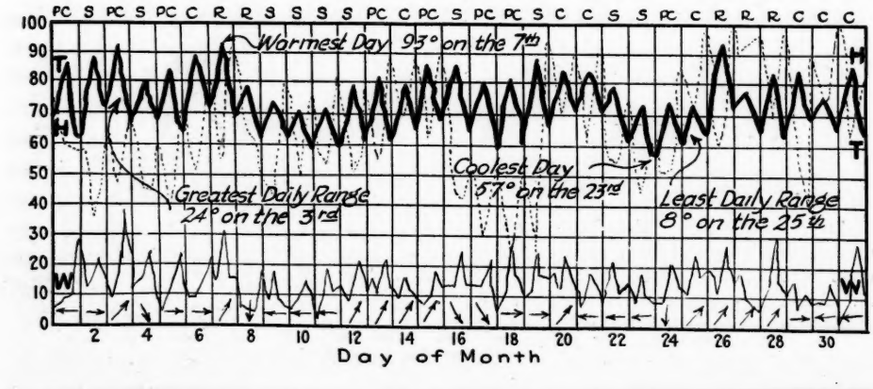
Pittsburgh

Mean temp. for month, 77.6°; aver. wind velocity, 8.0 m.p.h.; prevailing direction of wind, S.W.



New York

Mean temp. for month, 76.2°; aver. wind velocity, 11.6 m.p.h.; prevailing direction of wind, S.


Warmest Day 93° on the 7th
Greatest Daily Range 24° on the 3rd
Coolest Day 57° on the 23rd
Least Daily Range 8° on the 25th
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Day of Month

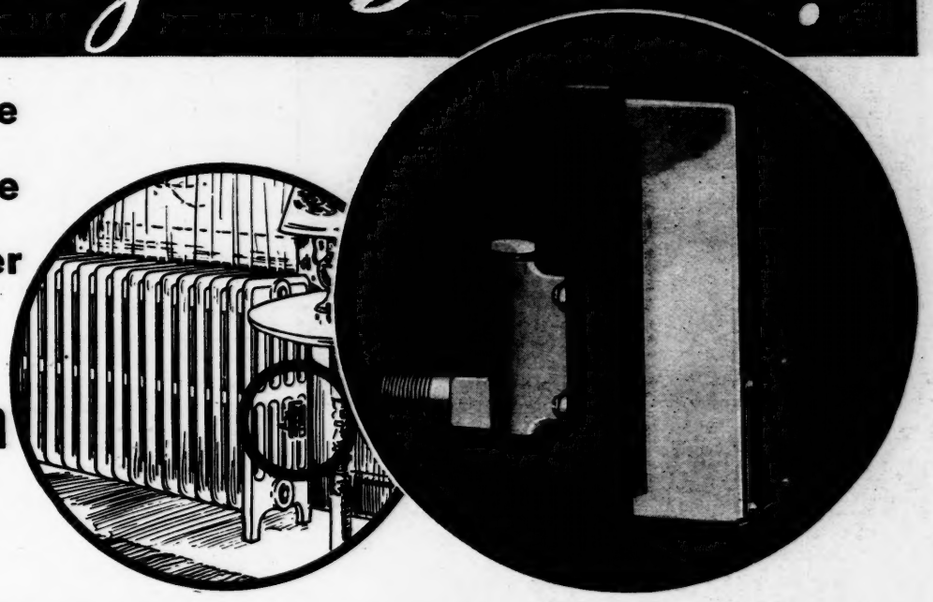
Boston

Mean temp. for month, 73.2°; aver. wind velocity, 12.1 m.p.h.; prevailing direction of wind, S.W.

Strange....Isn't it?

The most effective control of a one-pipe heating system ever developed is as

Simple as an air valve



FOR years heating engineers have been searching for some effective method of controlling a one-pipe gravity system—some method of correcting the overheating, the erratic heating, the unequal heat distribution and other faults that mar this otherwise effective form of heating.

In view of this, it is not at all surprising to find a number of heating men who are strictly from Missouri when we say that Evenaire *does* correct all of these faults. As a matter of fact, we were equally skeptical when we began the development of the present Evenaire System. Despite the fact that it showed amazing results from the outset, we insisted that it be tested for two heating seasons—tested under all conditions—before announcing it as the solution to the control problem for one-pipe systems.

As originally developed the Evenaire System consisted of a unit on each radiator with basement air charging devices. But while this represents the ideal system, it has been found that individual units with push-button air chargers can be installed on one or more radiators to correct overheating or erratic heating at the bad spots of the heating system. These push-button air-charger units enable the owner to know the effectiveness of Evenaire before installing additional units.

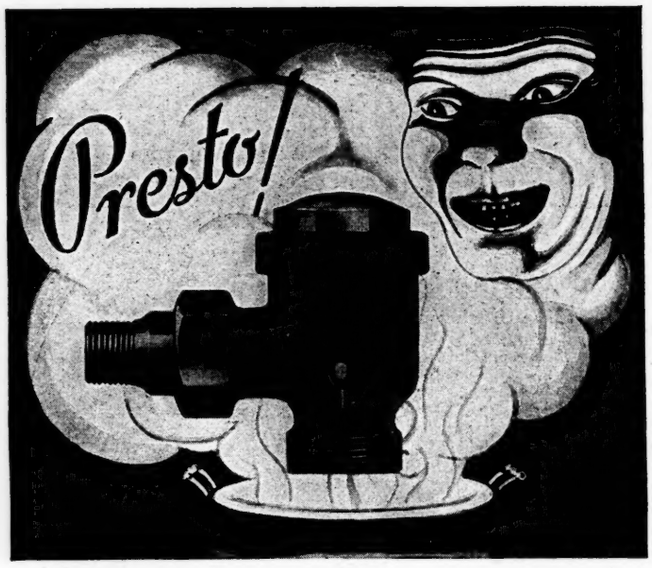
If you question the ability of Evenaire to give a real individual room temperature control, there is no better answer to your question than one of these push-button air-charger units. Put it to any test. Make it prove its case. You will then have a new conception of heat control for one-pipe systems.

Write for details and installation data.

NATIONAL REGULATOR COMPANY
2309 Knox Avenue, Chicago, Illinois

Evenaire

PRODUCT OF NATIONAL REGULATOR CO.



NEW Radiator Traps from OLD with SARCO Replacement Units

Sarco Adapters give new life to old radiator traps of any make. They will make radiators heat rapidly and evenly so that ample heat will be furnished with greatly reduced steam pressure.

Old radiator or drip traps equipped with Sarco Adapters are guaranteed equal to new in steam saving efficiency.

Sarco Adapters consist of a cap and a motor element. The cost is low, as you use your old bodies and do not have to disturb pipe connections.

Now is the time to modernize—a Sarco Adapter to fit every trap body and a Sarco Packless Valve Bonnet for all makes of Inlet Valves.

Tell us the make of heating system and we will send full information. Ask for Catalog F-111.

SARCO CO., Inc.

183 Madison Ave., New York, N. Y.

Branches in Principal Cities

SARCO CANADA, LTD.
Federal Bldg., Toronto, Ont., Canada

Also makers of Sarco Radiator Traps, Packless Inlet Valves, Combination Float and Thermostatic Traps, Return Traps, Air Eliminators, Steam Traps, Temperature Regulators and Strainers.

Comfort Cooling with Ice

(Continued from page 28)

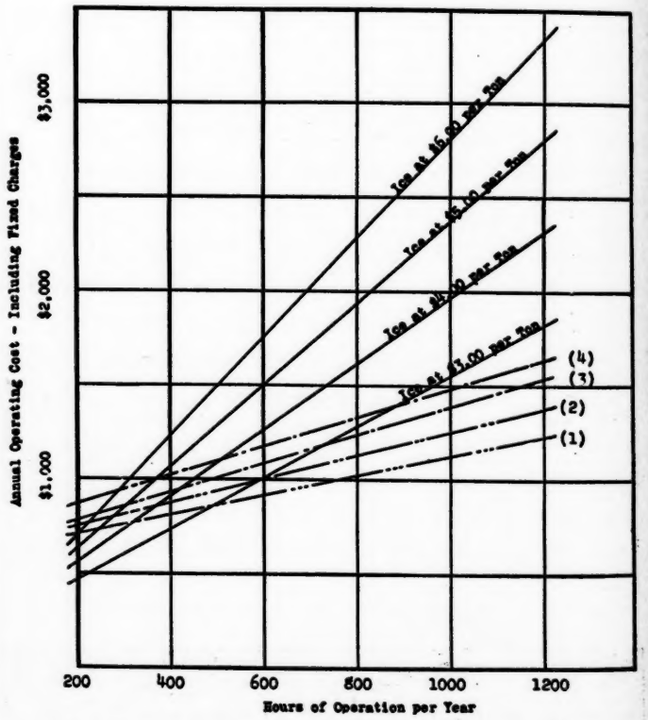
need for cooling does not justify more than a modest investment.

Included in this latter market are the small theaters operating for only a few hours daily, restaurants serving the bulk of their clientele during a two- or three-hour period, auditoriums, banquet halls, churches, funeral homes, lodge halls, clubs, and residences of moderate cost. Although ice can be applied to any comfort cooling problem, it has particular advantages in this field of application due to its low initial cost, simplicity of operation, and ability to meet sudden demands for a high refrigeration rate.

Cost of Ice Cooling

As the equipment required for providing the cooling medium for an air conditioning system, employing ice as the refrigerant, consists only of an ice melting tank, a small water circulating pump, and such piping and fittings as may be required, the initial investment is usually lower than for any other type of refrigeration. The largest single item in the annual operating cost of such a system will be the cost of ice. Many ice manufacturers have recognized the importance of this factor as the keystone to the development of the ice space cooling market and some of them have instituted special prices for ice used for air conditioning. These prices, at the present time, vary from $2.50 to $7 per ton.

Likewise, it may be said that a mechanical refrig-



Comparison of Operating Costs, Ice and Mechanical Refrigeration.
(1) Mechanical refrigeration equipment at 3 times the cost of ice equipment with 2c electric energy. (2) Same with 3c energy. (3) Same with 4c energy. (4) At 3½ times the cost with 4c energy.

eration system will usually require a greater initial investment and the operating costs, exclusive of fixed charges, will be lower.

Although these general relationships exist and they suggest that cost considerations will favor ice refrigeration when the total hours of operation are to be comparatively small, experience has shown that a careful engineering analysis must be made for each specific installation before any logical conclusions can be reached.

None of the equipment comprising an ice or a mechanical refrigeration system carries an f.o.b. factory price. Often a major portion of the initial cost provides for the installation of equipment, and building alterations. There has, therefore, been a wide latitude in the cost of installations that, on first inspection, would appear to have similar requirements.

Consideration must also be given to the hours the equipment is to be operated each season; the relationship between the average capacity delivered and the maximum capacity required; the need for flexibility to meet fluctuations in load, and local code restrictions. All of these factors may have an important bearing on final decisions both as to the selection of equipment and the cost of operation.

Other factors that have a more apparent importance are the local price of ice, the cost of power and water, and the basis of setting up the fixed charges on the equipment. The amortization of capital expenditures will, to a large extent, depend upon the attitude of the purchaser. In some cases, for instance, the tenant holding a short term lease may wish to write off the entire investment before the termination of his lease, even though the useful life of the equipment may be several times this period.

NEW CATALOGS

Alfol Insulation Co., Chrysler Bldg., New York. A four-page, standard-size folder giving heat transmission coefficients for walls, floors, and rooms insulated w'th Alfol; instructions for handling and installation, and discussions of various characteristics of this company's aluminum insulation in regard to safety, sound deadening, dampness, etc.

The Babcock & Wilcox Co., 85 Liberty St., New York. Details of design and construction of the B.&W. integral-furnace boiler and operating characteristics of several installations are contained in a 20-page illustrated booklet. This new unit includes boiler, superheater, water-cooled furnace, and fuel-burning and control equipment, and will utilize pulverized coal, oil, or gas fired singly or in any combination; standard size.

The Brown Instrument Co., Philadelphia, Pa. A new catalog on Brown hygrometers for recording and controlling humidity. Illustrates the latest models and explains operating principles.

Dail Steel Products Co., Lansing, Mich. Two loose-leaf, punched, standard size folders describing the company's warm-air furnace conditioners. Folders give specifications and engineering data necessary for designers.

The Dayton Rubber Manufacturing Co., Dayton, Ohio. Catalog No. 160, standard size, loose-leaf punched, 16 pages. Bulletin describes and illustrates the company's Dayton V-flat drives. Includes general and specific data covering dimensions and sizes.

Whitlock-EVERDUR Type K Storage Heater installed at Univ. of California Medical Building, San Francisco. *Architect, Wm. C. Haynes; Mech. Engr., F. P. Walsh; Plumbing Contractor, Scott Co., all of San Francisco.*

Again the answer was
WHITLOCK-EVERDUR

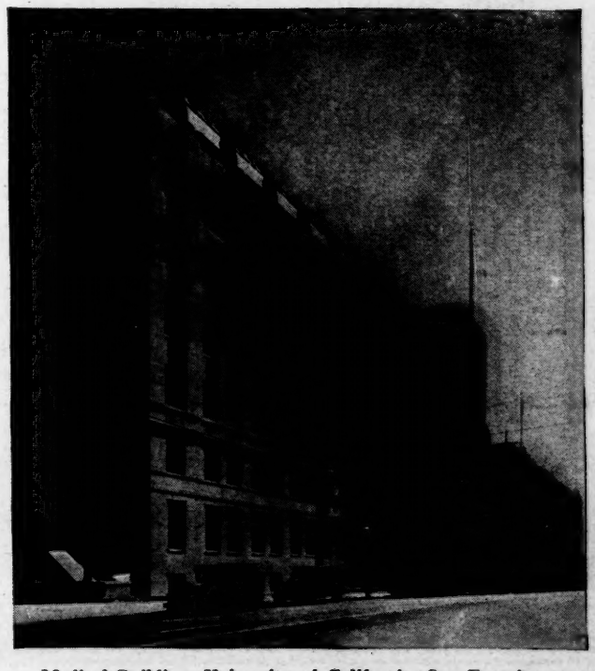
How can we be sure of **always** having plenty of **clean, hot** water?

Install a Whitlock-EVERDUR Storage Heater—this is right for three reasons:

1. It will be **hot** for it is the same Type K design you've known for years.
2. It will be **clean** for its Everdur shell cannot rust.
3. And you will **always** have it for, being rustless, Everdur is "good for the life of the building."

Everyone owner, architect, engineer, contractor, and tenant – is happy when this selection is made. Try it and see! Write for details.

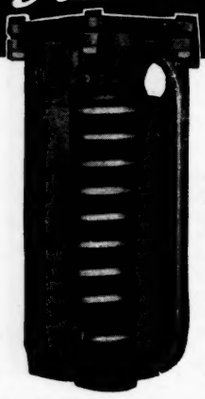
• The Whitlock Coil Pipe Company
• 40 South Street Hartford, Conn.
•
• Consult local telephone directory for address in New York, Boston, Philadelphia, Chicago, Detroit, Kansas City, Baltimore, Charlotte, Los Angeles, San Francisco, Cincinnati, and other principal cities.
• In Canada, Darling Bros. Ltd., 129 Prince Street, Montreal.



Medical Building, University of California, San Francisco.

HOT WATER COST

Slashed $501 IN 6 MONTHS



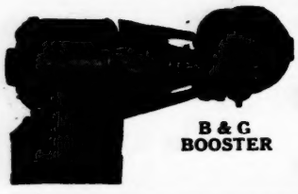
B & G Indirect Heater Ends Water Heating Extravagance in Pittsburgh Plant

Cutting hot water expense from $588 to $87 during six months' operation is the gratifying experience of a Pittsburgh manufacturer who recently replaced a separately fired heater with a modern B & G Indirect System. Here's ample evidence that the B & G System of heating service water with water from the heating boiler—*winter and summer alike*—is the most economical method yet devised!

B & G Systems a Profit Opportunity for Heating Contractors

B & G INDIRECT HEATER

B & G TWINFLO CONTROL VALVE



B & G BOOSTER

B & G Indirect Water Heating Systems are adaptable to either hand or automatically-fired steam or hot water heating boilers. The Triple Duty System, in particular, offers three outstanding benefits—constant domestic hot water, positive heat control and rapid heating. Completely automatic and trouble-free, this unit assures heat and hot water at less than the cost of heat alone. Write for full information.

AIR MAIL SERVICE ON SKETCHES

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An Air Filter Should be Measured Not by What It Stops

But by What it Passes!

Any air filter stops a certain amount of dirt. The question is—how clean is the air it passes?

With the ANNIS AIR FILTER you get the highest possible efficiency—99.9% plus (by test).

"Lowest Cost Plus Highest Efficiency"

GET THE FACTS—WRITE FOR BULLETIN F-320.

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ANNIS AIR FILTERING EQUIPMENT

Economy Pumping Machinery Co., 3431 West 48th Pl., Chicago. Bulletin F434, "Horizontal Non-Clogging Pumps," an eight-page, standard-size bulletin illustrating and describing pumps for the handling of solids. These pumps have waterways sufficiently large to pass any solid that will go through the connecting pipes. Capacities range from 50 to 10,000 g.p.m. at heads up to 120 ft. Includes capacity tables, outline dimensions, and descriptive details.

The Esterline-Angus Co., Indianapolis, Ind. A small booklet, "Solving Industrial Crimes, Case No. 3," describing an experience of a manufacturer following the installation of recording instruments. Includes catalog material of the company's line of recording instruments; 12 pages, 4¼ in. × 5½ in.

Fox Engineering Co., 36 Portland St., Boston, Mass. Folder describing the company's line of non-electric thermostatic valves available for the control of temperature in rooms or in hot water tanks and for controlling pressure. The units are self-contained for automatic and remote control. The company is prepared to furnish special controls covering practically any range of temperature or pressure desired.

Groff Safety Relay, Inc., 3817 Ashland Ave., St. Louis, Mo. A brochure describing the company's relay for electric oil burners and designed for the prevention of boiler explosions. The bulletin contains a description of the relay, detailed instructions on installing it, together with testimonial letters.

The Holtzer-Cabot Electric Co., 125 Amory St., Boston. A four-page, standard-size bulletin describing the company's Type RWS split phase standard and special motors of ¼ hp. and less. These units are designed for such equipment as fans and blowers, oil burners, electrical controls, and other similar material. Bulletin includes information on application, construction, and performance, together with dimensional data.

The Imperial Electric Co., Akron, Ohio. Bulletin 1040, "Why You Should Buy from the Little Fellow." In view of the comment as to the position of the small organization under NRA codes, this bulletin is particularly timely. It was prepared to show that in the competitive field of electric motor manufacturing there are many reasons why the small manufacturer is able to render a distinctive type of service.

Inland Steel Co., 38 South Dearborn St., Chicago. A new edition of "Sizes We Roll," a 64-page, punched, booklet, including size data on all Inland products with the exception of rails, track accessories, and tin plate, together with other gauge, weight, and bundling tables; 3¾ in. × 8½ in.

McCord Radiator & Manufacturing Co., Unit Heater Div., Detroit. Four-page, standard-size bulletin. The bulletin contains descriptive material, illustrations, capacities, and engineering and dimensional data on the company's unit heaters.

Merco Nordstrom Valve Co., 400 Lexington, Homewood, Pittsburgh. Bulletin V-102, covering the Nordstrom lubricated plug valve available in sizes from 2 to 12 in., to permit installation where gate valves of the same dimension have been installed. Includes illustrations, blueprints, and specifications covering the different types for various working pressures. Flanged and screwed valves are shown; also types for worm gear and wrench operation.

National Radiator Corp., Johnstown, Pa. A booklet "The National Line," a condensed catalog covering the company's cast-iron and steel boilers, radiators, convectors and unit heaters; 24 pages, 3½ in. × 6¼ in.

National Radiator Corporation, Johnstown, Pa. Form No. 180, a 12-page folder featuring the modernizing possibilities of the company's line of jacketed cast-iron boilers.

Pangborn Corporation, Hagerstown, Md. Bulletin No. 197 describing the company's Type CH all metal cloth screen dust collector. Profusely and handsomely illustrated with photographs, drawings, dimensional data and full description. Standard size, 24 pages.

Clyde R. Place, consulting engineer, Graybar Bldg., New York. "Air Conditioning — Planned and Proved"— an 18-page brochure outlining the objectives of this organization. what it is, and explaining how the Place organization can reduce operating costs by careful design of conditioning systems. An impressive list of buildings for which this organization has acted as consulting engineer is included.

Prat-Daniel Corp., 350 Fifth Ave., New York. A four-page standard-size folder on the company's line of Thermix multi-cyclone dust collectors. Includes technical data and descriptive matter.

R-S Products Corp., Philadelphia, Pa. Four-page, standard-size, loose-leaf-punched bulletin on the company's line of gate valves, made in standard sizes from 2 in. to 45 in., designed for controlled flow of air, gases, and liquids. The bulletin includes descriptive, dimensional, and price data.

B. F. Sturtevant Co., Hyde Park, Boston, Mass. Catalog No. 295-1 entitled "Sturtevant Air Washers." Bulletin describes and illustrates the company's line of washers. Includes dimensional and capacity data in considerable detail. A supplement to the catalog is a Bulkeley psychrometric chart on heavy paper. Standard size, 20 pages.

Thermal Corporation, Farmers Bank Bldg, Pittsburgh, Pa. An 18-page standard size bulletin describing the company's fireproofing insulation. Catalog is illustrated with installation details, description of the proofings, physical characteristics, instructions for installation and specification writing, as well as heat transmission co-efficients.

Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pa. A 16-page bulletin in color describing and illustrating the company's cylinder-guided expansion joints. Includes detailed dimensional data.

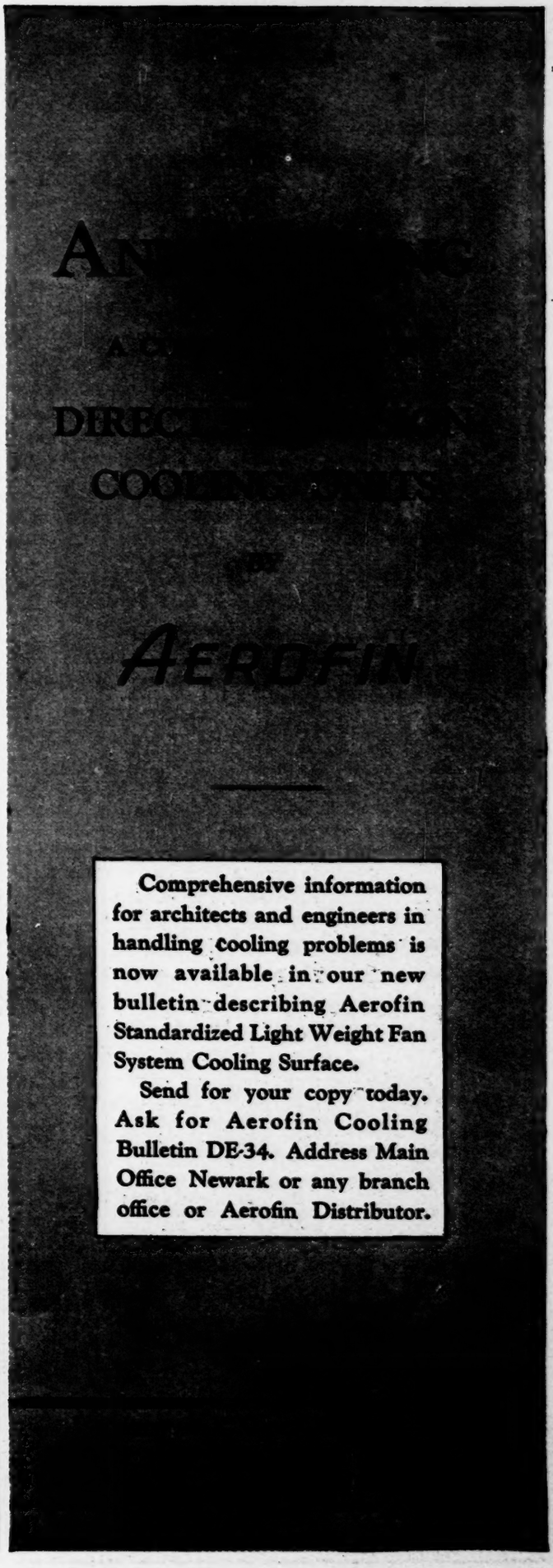
Young Radiator Co., Racine, Wis. Catalog No. 534, devoted to Young unit heaters. The company has added a number of new models to this line, and these are included in the new catalog. Includes information on construction, well illustrated; detailed capacity and dimensional data for the heaters at various steam pressures and for varying entering air temperatures. Includes sketches for suggested methods of attaching and for seeing rough-in dimensions. Standard size; 12 pages.

Modern Unit Stokers for Heating

(Concluded from page 39)

Installation and Service

Installation of most of the unit heating stokers where all the principal parts are factory-assembled is not a labor-consuming job but it is necessary to make sure that the field work is correctly and carefully done. The best insurance is to have it installed by someone who is thoroughly familiar with the stoker itself and who also understands heating and combustion well enough to put the mechanism in operating condition. While the physical work is not great, installation and adjustment should not be left to a novice. Satisfy yourself that the work will be in competent hands by including installation and adjustment as one of the considerations in selection. The best stoker in the world poorly installed will not result in a job to be proud of. There is a considerable body of practical and scientific material in existence to serve as a means of checking an installation. Actual details necessarily vary with each make and are available from the makers.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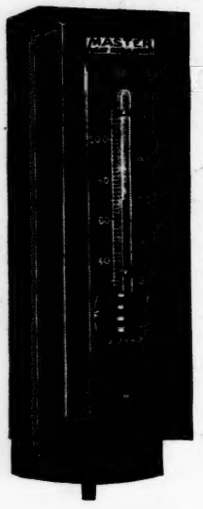
Comprehensive information for architects and engineers in handling cooling problems is now available in our new bulletin describing Aerofin Standardized Light Weight Fan System Cooling Surface.
Send for your copy today. Ask for Aerofin Cooling Bulletin DE-34. Address Main Office Newark or any branch office or Aerofin Distributor.

THE HEAT REGULATOR
THAT HELPS YOU SELL

No man wants to buy a heating plant. What he wants is winter comfort at the lowest possible cost. He will deal with you if he finds that you can provide this. You can. You can equip his plant with the heat regulator that will put back into his pocket a considerable sum of money he would otherwise have to pay for his winter comfort... the MASTER Heat Regulator.



Type 144

The MASTER is a salesman both before and after installation. It provides you with an economy argument to close the deal for heating equipment. Installed, it operates so quietly and efficiently that the customer refers his friends to you for similar equipment. *You need this salesman.*

You need, also, the double profit on MASTER Heat Regulators... the good margin on the regulator itself, and the profit on an easy installation. Once installed the job is done. No time spent later in trying to make it work. It is built for long-time service with platinum-iridium contact points, and by a respected, dependable pioneer in the industry. *You need this backing.*

Have us send you complete information on

a proposition so interesting that you should write, today, asking us about it.

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AMERICAN STEEL SHEETS

FOR ALL KNOWN USES

AMERICAN SHEET AND TIN PLATE COMPANY PITTSBURGH

For Air Conditioning Systems
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Use sheet metal products of recognized value and reputation—AMERICAN Black Sheets, Apollo Best Bloom Galvanized Sheets, Keystone Rust-Resisting Copper Steel Sheets, Galvannealed Sheets, Heavy Coated Galvanized Sheets, Tin and Terne Plates.

This Company also manufactures USS STAINLESS and Heat Resisting Steel Sheets and Light Plates for all known purposes.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

AIR CONDITIONING
Today's Biggest Profit Field

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- **DE-HUMIDIFIERS**
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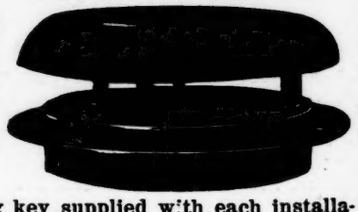
Capacities 10,000-75,000 C.F.M. For Cooling by Evaporation or Wells

A complete line of quality equipment priced to sell, combined with our layout service for theatres, churches, restaurants, apartments, hotels, etc., enables you to get the business. *Wire or write for details*

SUPER-AIRE CO. **3032 OLIVE STREET ST. LOUIS, MO.**

Adjust Them—Lock Them—Forget Them

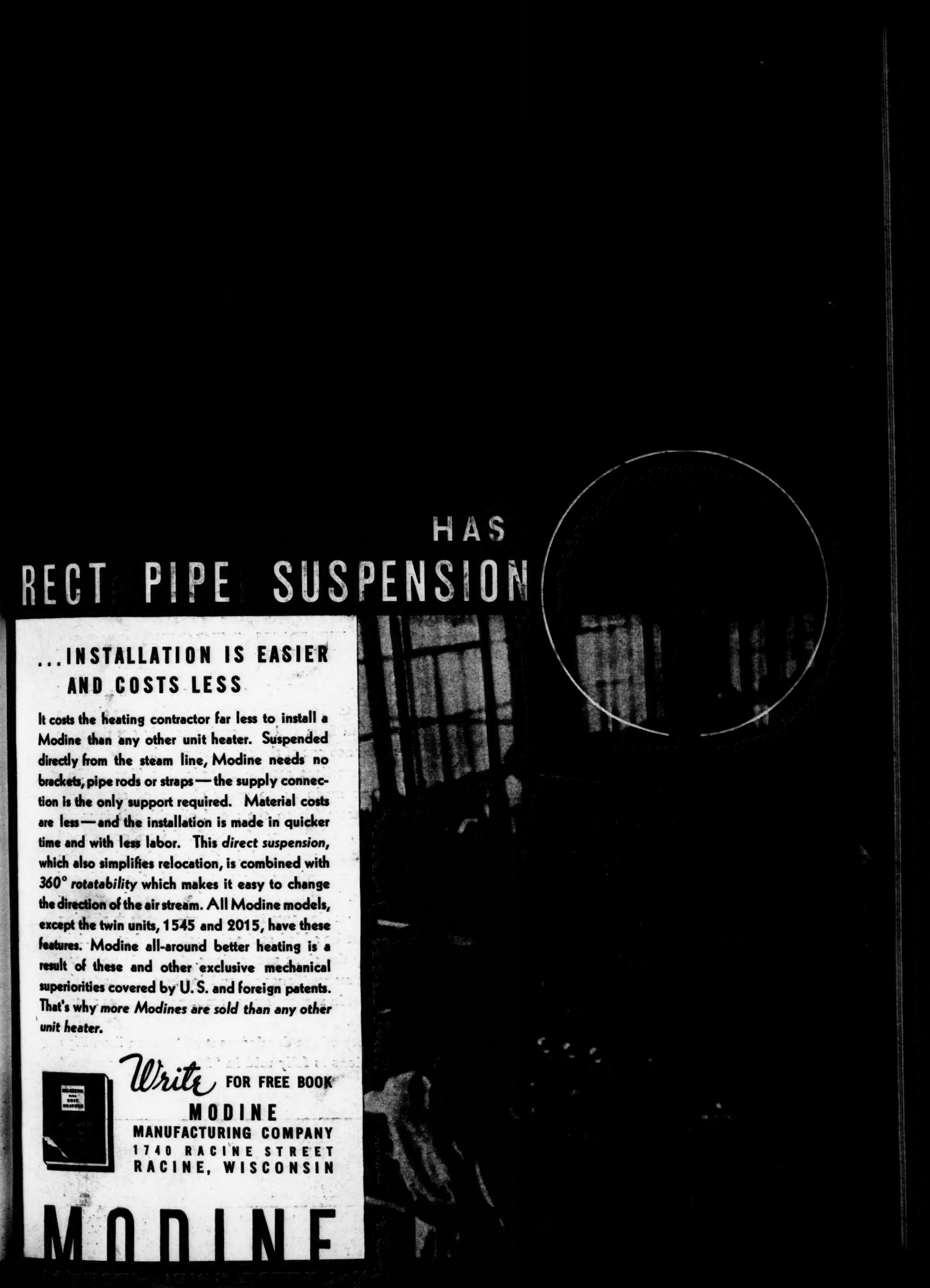


KNOWLES NU-NOTCH MUSHROOM VENTILATORS cannot be tampered with—That's important in School Ventilating Systems.

The new, special-locking key supplied with each installation successfully prevents all meddling or rattling of mushroom heads.

10 recessed notches for absolute air control. Use them for up draft or down-draft ventilation in School auditoriums, theatres or public buildings where the seats are fixed.

KNOWLES MUSHROOM VENTILATOR CO.
41 North Moore Street **NEW YORK, N. Y.**



...INSTALLATION IS EASIER AND COSTS LESS

It costs the heating contractor far less to install a Modine than any other unit heater. Suspended directly from the steam line, Modine needs no brackets, pipe rods or straps — the supply connection is the only support required. Material costs are less — and the installation is made in quicker time and with less labor. This *direct suspension*, which also simplifies relocation, is combined with *360° rotatability* which makes it easy to change the direction of the air stream. All Modine models, except the twin units, 1545 and 2015, have these features. Modine all-around better heating is a result of these and other exclusive mechanical superiorities covered by U. S. and foreign patents. That's why *more Modines are sold than any other unit heater.*

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